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MINING AND SCIENTIFIC PRESS.

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An Illustrated Journal of Mining, Mechanics and Popular Science.

VOL. LXVII.—Number 1.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, JULY 1, 1893.

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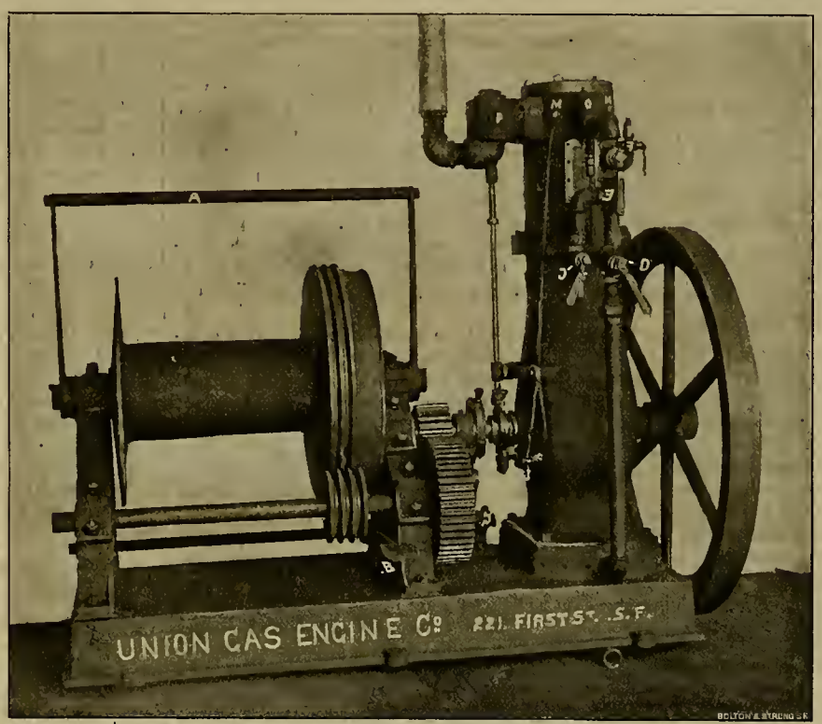
Improvements at the North End.

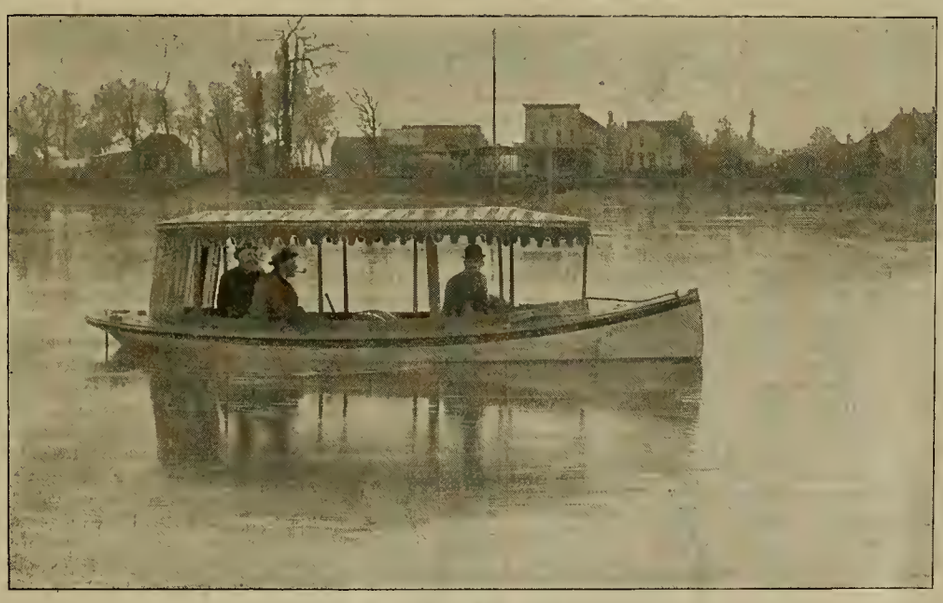
The work which has been commenced by ex-Senator James G Fair on his extensive property on the bay shore between Black Point and the Presidio marks an era in the progress of this city. That section of the city has heretofore been entirely neglected, yet it fronts on deep water and is splendidly adapted for manufacturing purposes. The Fulton Engineering and Shipbuilding Works have already been established there and other industrial establishments will doubtless follow when the sites are prepared. Last week Senator Fair awarded a contract to Warren & Malley for the grading, filling in, etc., of 2,500,000 cubic yards of sand in that section of North Beach between Webster and Baker streets. The contract was for $300,000. It is estimated that the contractors will move 5000 yards—about 5000 cartloads—a day, and will employ 200 men. It will require two years to remove the sand. The plans of ex-Senator Fair in this enterprise involve the expenditure of $3,000,000, and this vast outlay of money will give some idea of the magnitude and importance of the work. The letting of the above contract and others necessary for the completion of the work will give employment to quite an army of deserving laboring men greatly in need of work. It is refreshing to see one of our greatest capitalists spend his money freely in a direction like this, rather than loan it out at cent per cent as is too much the custom in this city. Of course ex-Senator Fair expects to make money out of this investment either in sales or leases of the land, but he must disburse a large amount before any return can be expected.

The foundry and other large industrial establishments needing a water frontage have been unable to obtain it within the present improved limits of the city. The Union Iron Works, Pacific Rolling Mills, sugar refinery and dry dock already have the available points to the south, but over at North Beach there is a wide stretch of unused territory which can readily be improved. It is on part of this that Senator Fair is at work. In time the seawall will be extended out to this section, and the belt railroad be operated also. Then the factories, etc., will have both water and rail communication. Moreover, they can obtain very large tracts suitable for manufacturing purposes, instead of being crowded up in the more thickly settled portions of the city. The whole northern and western beach of San Francisco has a great future, and Senator Fair's example will doubtless be followed by other property owners who own land in that part of the city.

"ARRASTRE" JOHNSON has a bond on a black sand gold mine out at the ocean beach, but it is not the mine being operated by "Prof." William Patterson. Johnson has a new machine for working black sand for which a patent has been allowed, and he intends trying it out at the beach on the mine he has bonded.



HOISTING PLANT WITH GAS ENGINE.



UNION GAS ENGINE LAUNCH.

Gas Engines for Hoists and Launches.

The use of "vapor" engines is very largely increasing in these days, for, while at first mainly applied for marine purposes, it has been found that there is a wider range for them ashore. The Union Gas Engine Co. of this city manufactures a vapor engine so simple that it requires no skilled mechanic or engineer to operate it. The efficiency is such that the engine can be used in any place or for any purpose where power is required, for it needs neither fire, boiler, pumps nor other appliances that are of necessity used with steam engines. The mechanism is such that but a moment is required in which to start it. There is no smoke, dirt nor ashes, no steam or water gauge to watch, and no irregularity of motion. These engines are made from one to fifteen horse-power.

Among other purposes to which this engine has been adapted is for hoisting from mines, etc. One of the engravings on this page shows a four-horse power engine and hoisting gear, all on one bed ready for use. For small mines such a rig as this is very convenient indeed. The fuel is cheap and easily transported. No wood, coal or water are needed. The big boiler of the usual steam engine is entirely dispensed with. A number of machines of this type have been put in use in this State recently. This month a complete outfit for J. F. Cowdery was shipped to his mine in Sierra county, consisting of a double drum hoist and six-horse power Union engine. An actual working test made before shipment proved very satisfactory to the purchaser.

A number of vapor launches with these engines are plying in the bay and rivers. A 22½-foot launch with three-horse power engine, and finished in the best style, has been built for the estate of H. J. Glenn, at Jacinto. An engraving of one of this type of launches is shown on this page. A "stern wheeler" for service on Eel river, Humboldt county, was built not long since, and she makes four knots an hour against the strong current. Some 300 gas-engine launches and boats have been built here. There is no infraction of the navigation laws in using these vessels, and they are free from the annoyances and expense attending government inspection of ordinary steam vessels. The county of Sacramento has placed an order for five engines, which are to be used for pumping water for sprinkling the roads, and Napa county has also ordered several for the same purposes. The use of these gas engines is constantly increasing.

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W. B. EWER. }
CHAS. G. YALE. } ..... EDITORS

Our latest forms go to press on Thursday evening.

Entered at the S. F. Postoffice as Second-Class Mail Matter.

San Francisco, July 1, 1893.

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The Price of Silver and the Mining Interests.

The worst blow to the silver mining industry in this country which it has ever received came unexpectedly and from an unexpected source, in the announcement that the mints of India had ceased coining the white metal. That country has long been known as the greatest consumer of silver, yet the Indian Council has passed an order for the immediate closing of the Indian mints to the free coinage of silver. In the English House of Lords, Earl Kimberly, Secretary of State for India, made this announcement on Monday, and added that arrangements are being made to issue rupees from the mints in exchange for gold at the rate of 16d per rupee, and for receiving sovereigns and half-sovereigns at the treasuries in payment for dues at the same rate. He further said it was intended to introduce a gold standard in India, but that gold in the meantime would not be made the sole legal tender.

This news was almost paralyzing to the silver miners of this country and to all advocates of free silver coinage. Almost immediately the price of the metal fell to the lowest point ever before known. Merchants are petitioning the President to take steps toward the repeal of the Sherman silver bill, and it is probable that Congress will soon be convened to take action. Meantime the free coinage men have opened headquarters in Washington and will make a vigorous campaign. Governor McConnell, as President of the Trans-Mississippi Congress, has appointed Senators Teller of Colorado and Mitchell of Oregon to act with Senator Stewart of Nevada as a committee to present the free-coinage resolutions adopted by the congress to the United States Senate.

Aside from the financial and political features of the subject, those which relate to the mining of the metal interest our readers most. As might have been expected, such a disastrous drop in value as occurred immediately caused the closing down of a lot of mines, and more must follow. In Utah, on Tuesday, the Daily West mine at Park City was ordered closed down. The Diamond mine at Eureka, Nev., and the old Jordan and Galena at Bingham were also ordered closed. The owners of the following mines say that they will close in a few days: The Sampson at Bingham, the Bullion, the Beck and the Champion at Tintic, the Caroline at Eureka, the Yosemite at Bingham, the Crescent at Park City and the Anchor at Park City. These have all been steady and strong producers.

In Colorado, which is the largest producer of silver of any of the States, the decline in silver created the greatest apprehension. Davis H. Moffatt, the largest mine-owner in the State, said: "The situation is exceedingly grave. I have wired all my managers to come to Denver at once. Seventy-seven cents for silver mined by men who are paid $3 a day means a loss to the mine-owner. My idea is to propose to the men in my employ that instead of receiving $3 a day they they should be satisfied with two-thirds of that sum until silver shall return to a fairly reasonable price. If they do not accept such a proposition I shall be compelled to shut down all my property."

Senator Wolcott said: "If an extra session of Congress should be called to-day the Sherman law would not be repealed. Times are dark enough to indicate that a streak of light must break in from some direction soon. This means immediate disaster to Western interests, but it may be a blessing in disguise if we can hold on. If we suffer, the disaster entailed to Great Britain is worse, and the continued fall in the price of silver must force some international agreement."

From all quarters come accounts of mines and smelters closing down. There is a strong probability that the big smelting and refining works at Omaha will be closed down for the present. In the Wood River country, Idaho, it has been determined to cease shipping entirely, as the properties producing lead and silver ores cannot be worked at a margin. Those mines able to continue work without shipping will do so with a largely decreased force, while those not absolutely compelled to continue will close down altogether and await developments. At Butte, Montana, nearly all the silver mines are being closed down. The Alice, one of the largest producers, commenced closing down everything about the mines except pumps Wednesday; the mill will make a clean-up and then hang up the stamps. The Moulton and Lexington will probably follow suit in a day or two. Several of the smaller mines were also closed Wednesday. All ore purchasing has ceased. The copper mines of Butte will not cease operations, but the question of reducing the miners' wages from $3.50 to $3 per day is receiving serious consideration. Prominent mine-owners of Montana on Wednesday issued a call for a State convention, to be held July 6th, to take steps to impress upon the coming extra session of Congress Montana's demands. It is likely a strong organization will be effected, and Montana headquarters will be established at Washington.

India and Mexico have heretofore been the only countries in the world where the free coinage of silver was undertaken, and now with India stricken from the list, the United States, with its silver-purchase bill, will have only Mexico to assist it in keeping up the value of silver. Denver smelters feel very severely the drop in silver. They have on hand an average of about 500,000 ounces each, enough to last for several months without making any new contracts, but the trouble is there is absolutely no market for silver, and if the smelters cannot dispose of the products of their works it will be impossible to continue running. It is estimated that the smelters in Denver and throughout Colorado have lost in the aggregate $650,000 on ore bought during the last week and which has fallen so greatly in value in the last two days. It was bad enough when it went to 77 cents, but it is at present writing as low as 69 cents with no indications of stopping the downward movement, though speculators will doubtless try and increase the panic in the hope of profit later on.

The situation is not only bad for the silver miners, but for the lead and copper miners as well. The bulk of the silver of this country does not come from milling ores of silver mines, but those producing lead and copper as main products.

The following table, carefully compiled from information furnished by the officers and agents of the United States mint in charge of the collection of the statistics of the precious metals in the different producing States and Territories, exhibits approximately the sources from which the silver product of the United States for the year 1892 was obtained—that is, tho distribution of the product among the three classes into which argentiferous ores naturally group themselves, viz: (1) Quartz and milling ores (silver ores proper); (2) argentiferous lead ores; (3) argentiferous copper ores:

State or Territory.	Fine Ounces Silver in			Total.
	Quartz and Milling Ores.	Lead Ores.	Copper Ores.	
Arizona	949,720	112,500	.....	1,062 220
California	360 000	.....	.....	360,000
Colorado	10,500.000	12,100,000	1,400,000	24,000,000
Idaho	824 000	2,340,269	.....	3,184,269
Montana	9,200 000	2,350,000	5,800 000	17,350 000
Nevada	2,024 000	220,000	.....	2,244 000
New Mexico	625,000	450,000	.....	1,075,000
Utah	1,640,000	6,460.000	.....	8,100,000
All others	401,000	200 000	44,511	644,511
Total	26,522,720	24,232,769	7,244,511	58,000,000

From an examination of the above table it will be seen that of the 58,000,000 ounces of silver produced in the United States during the calendar year 1892, about 26,500,000 ounces were extracted from milling ores—that is, silver ores proper, while 24,200,000 ounces came from lead ores, and 7,200,000 ounces from copper ores.

It would appear, therefore, that less than one-half of the silver product of the United States is derived from mines producing silver ores proper, and that considerably more than one-half of the entire silver output of the United States is an incidental product from the smelting of lead and copper ores, although this incidental product is frequently more valuable than the other metals contained.

It is not only the silver mines pure and simple which are affected by this marked decline in the white metal. The argentiferous lead mines of Idaho, Utah and elsewhere cannot possibly go on under the present conditions. Lead itself is very low in price, and with the value of the silver eliminated these mines must stop. Even last year there was a greatly diminished production of silver in certain quarters, and the whole United States made a smaller silver product by 330,000 ounces than in 1891. All the States fell off in product except Colorado and Montana. The latter increased its product of silver over that of 1891 by 1,000,000 ounces, and Colorado increased nearly 3,000,000 ounces. The largest falling off is in the States of Nevada and Idaho, the product of Nevada having decreased from 3,500,000 ounces in 1891 to 2 244,000 ounces in 1892, and in Idaho from 4,035,000 ounces in 1891 to 3,164,269 ounces in 1892. The product of Utah also shows a decrease from 8,750,000 in 1891 to 8,100,000 in 1892. The Mint estimates the silver product of our mines for the calendar year 1892 at 58,000,000 ounces (troy) of pure silver, worth, at the average commercial price of silver during the year ($0.875 per fine ounce), $50,750,000, and of the coining value of $74,989,900, against a product in 1891 of 58,330,000 ounces of fine silver, worth, at the average price during that year ($0 988 per fine ounce), $57,630,040, of the coining value of $75,416,565.

As the greatest silver producers, Colorado and Montana will feel this sudden depression most, and more mines and miners will be affected in those States. Nevada, Utah, Idaho and New Mexico will also be seriously injured as to their mining interests, and proportionately in the order mentioned. With the exception of Oregon and Washington, California, among the mining States, will be the least seriously affected, our silver product being now only about 360,000 ounces per annum, while our gold yield is $12,571,900, or over one-third of the total of the United States. We have referred to this more fully in another column of this number of the PRESS.

The silver miners have thought they had fallen on hard times when silver was in the "80's," but now it is low down in the "60's," there is apparently nothing left for them to do but quit work and see if Congress can help them out.

California's Chance.

For once California, as a mining State, is in luck in having so few silver or lead mines within her boundaries. And she is still further in luck in having more gold mines than all the other States of the Union put together, and a greater variety of gold mines also. In this State we get gold from quartz, hydraulic mines, drift mines, river bars, river beds, banks, ocean-beach sands, black sand coast deposits and ordinary placers. Gold is our principal mineral product, and gold is what is wanted just now most of all. The bottom has dropped out of silver; lead is low and the silver-lead mines must stop with those of silver; and the situation is not good for those copper properties with silver as a by-product. In all the States they are shutting down the silver-yielding properties and are hunting for those which carry gold.

And this is California's chance. It would be improper to rejoice at the misfortunes of our neighbors, but this time what is their loss is our gain. If men want gold properties in number and variety, this is the State to come for them. Our gold belt is about 700 miles long and extends practically from one side of the State to the other. The ocean beaches yield gold; the tops of the Sierras yield it, and it is found on the desert boundaries. San Diego on the south has gold mines and so have Del Norte, Siskiyou and Modoc counties on the north.

Between these extremes there is scarcely a county in the State where the precious metal is not found in greater or less quantities. Even what are known as the purely agricultural counties take pride in their mining claims. Golden grains and golden fruit come from the same soil. Oranges on the surface and gold-bearing gravel below are common in Butte, Placer, Yuba, and other counties.

There are enough paying mines to yield nearly $13,000,000 a year now at work. But there are some thousands of undeveloped or partly developed claims and "prospects" which need capital to make them productive. This capital has been lacking in our own communities who have neglected the opportunities too close at hand, and too familiar, to attract the attention they deserve. But mining men from Colorado, Utah, Idaho, Montana and elsewhere, who must now desist from silver and lead mining, will soon commence looking into our gold prop-

ertles here, and there will be sale for all those showing any prospective merit. Even the mere prospects will now have some value, for any prospect may turn out to be a mine. It only takes money to prove the proposition.

California took the lead in gold production over all other parts of the United States as far back as 1848 and has maintained it ever since. Last year, though reduced to the enforced cessation of hydraulic mining, the gold yield of California was $12,571,900. The next highest gold producer was Colorado with $5,539,021. It is thus seen that California has a long lead over even the second best of the gold-producing States.

If men are looking for investments in gold properties, as they must soon be, this is the State where they will naturally come. They would not think of California for silver, lead or copper, though we have all these. There are other places far better for these classes of mining. But in gold product this State stands pre-eminent, and there are plenty of chances to obtain properties more or less developed.

Resumption of Hydraulic Mining.

The California Debris Commission has thus far done little of anything beyond organizing. Comparatively few petitions for license to mine have been sent in, though there are many inquiries as to methods of procedure before the Commission. Just now two of the three members of the Commission are absent from town on duty in connection with their regular river and harbor work. There is nothing definite to report concerning any examination of mines by the Commission. It will probably be some months before any mines obtain licenses to work by the hydraulic method.

In this connection it is interesting to note that the *Daily Report*, of this city, has suggested that hydraulic mining in California should be at once resumed, and all restrictions removed in order to increase the gold supply and relieve the financial situation. The suggestion to start up the mines again has met the approval of a number of people, and among them two who have the charge of as much gold as any persons on this coast.

These are W. H. Dimond, superintendent of the United States mint in this city, and Thomas Brown, the cashier of the Bank of California.

General Dimond, superintendent of the United States mint in this city, was asked what he thought of the *Report's* suggestion that the Government remove all obstacles from the resumption of hydraulic mining at once.

"I heartily approve of the idea," said General Dimond. "Why, the Government has in our hydraulic mines a bank to draw upon for untold amounts, and why should it not seize such an opportunity? We helped the Government out in the time of the great civil war with our gold product, and we can do it again."

"Is the mint in this city prepared to coin all the gold which the mines may send to it?"

"The mint has machinery sufficient to coin the entire yearly bullion product of the world. All that would be necessary would be an increase of force. We are now completing our annual clean-up, which began on June 14th. We will be through by the 1st of July, and the examiner from Washington will then be here to count the money. We now have on hand about $57,000,000 in coin, of which $11,000,000 is gold and $46,000,000 silver, mostly standard dollars. We have, besides, 8500 bars silver, valued at about $9,500,000. During the count these bars must be weighed separately.

"Let the Government remove all restrictions from hydraulic mining, so that we can handle California's enormous store which is locked up in our hills, and we of the mint will do the rest."

Mr. Brown's opinion he expresses in the following letter:

Editor Daily Report:—SIR: In my opinion, the resumption of hydraulic mining in California would be a decidedly advance step toward increasing the gold product of this country. The gold output of this State materially decreased when these mines were closed down 10 or 12 years ago. They were said to be producing at that time from $8,000,000 to $10,000,000 in gold per annum. Whether they could reach that figure again is perhaps questionable, since the restrictions of the new laws affecting them will only permit certain favorably located mines to be worked, and even those would be limited in the amount of gravel they could wash behind restraining dams. The yield would therefore be less than when all could be worked without restrictions. Moreover, in many instances, ditches, flumes and other works are out of repair and a great deal of money will have to be invested to put the claims in order for work. I am informed by those who are familiar with the details of this branch of mining that, under favorable conditions, at least $6,000,000 a year of new gold could be obtained even now if the mines were at work.

Few people realize what an immense amount of gold California has yielded, or what the possibilities of its various gold-mining interests are. Nowhere else in the United States has there been or is there such an extensive and productive gold-mining belt as is found in this State. Of course, Colorado, Dakota, Montana, Utah, Oregon, Nevada, Arizona and Idaho have more or less gold mines, but none of these come anywhere near reaching California. We produce here in this State over one-third of all the gold yield of the whole United States, and could easily produce one-half. This State is still the leading gold-producer of the Union, notwithstanding the comparatively light yield of recent years, caused to a great extent by the total stoppage of the hydraulic gravel mines. Of gold alone this State has produced nearly $1,300,000,000 in about 43 years. California, with its grand gold product, still leads the combined aggregate gold product of all the other mining States and Territories by a thousand millions, and leads the aggregate gold, silver and copper product of any one of them by over $600,000,000. In one year only, 1852, California turned out $81,294,700 in gold.

In 1892, according to the official report of the Director of the United States Mint, the gold yield of this State was $12,571,900. Of course silver, quicksilver, chrome, borax and other mineral products are not considered here, as I am speaking only of gold production. For a single industry of the State this is a very good showing, but when we have the means at hand to make a better one we should at least try to do so.

The people of this State generally seem to desire the rehabilitation of the hydraulic mining industry, which is a peculiar one, and limited practically to California. The Governor, in an official message, called the attention of the Legislature to this languishing industry, which might be made again productive with proper measures.

The Legislature of this State then petitioned Congress to look into the matter. This action and the petitions of the miners met the indorsement of the Chamber of Commerce, Board of Trade and Board of Supervisors of this city, and corresponding bodies in other counties.

At the last State convention of both the two great political parties favorable resolutions to this industry were passed. The result of all this has been that Congress has passed a special law on the subject and appointed a special Commission to carry it out. As to the means to be employed I have no special knowledge, but they are recommended by the Government engineers.

It is to be hoped that every encouragement possible within reasonable limitations be given to the hydraulic miners, and that every mine which can be worked without committing material damage to the streams will be permitted to do so. In this way our gold product can be materially increased, to the benefit of the communities in this State and to the nation.

San Francisco, June 28, 1893. THOS. BROWN.

These expressions of opinion from two such prominent gentlemen will have considerable weight in the community, and serve to show not only that the gold in these mines is needed, but it is known where it can readily be obtained. The financial situation demands gold, and with such a storehouse as we have at our command in this State, it is a pity to see it remain locked up. Public opinion on this subject has greatly changed in the past few years. San Francisco has sadly missed the many millions these mines might have yielded if worked. With six or eight millions of new gold a year coming into this city from these mines, times would not be so dull.

Foundry Notes.

The foundrymen of San Francisco, like most other people in business here, are having rather dull times of it just now, and there is comparatively little work in the shops. Large jobs and contracts are very few during the present stringency in the money market.

Some very interesting tests will shortly be made in this city as to the best boiler to be used on the new Mission-street electric road, now being built by the Pacific Improvement Company. Heretofore this company has only used the Babcock & Wilcox boilers on their cable roads and street railroad systems, but the results obtained from the Heine boiler of the Risdon Iron Works have been so satisfactory and convincing that it has been determined to make tests with several boilers as to which will give the best evaporative results with Carbon Hill coal. The Heine boilers at the works of the S. F. Gas Co., at North Beach, have been selected, and the Babcock & Wilcox boilers of the Geary-street cable road. The Elephant boilers at the Union Iron Works will also participate in the test. Messrs. Eckart and Wilson will represent the Pacific Improvement Company as experts during this test, which will be carried out during the next two weeks.

The Risdon Iron Works are making a number of Bryan mills and Johnson concentrators, but outside of this little is doing in the mining machinery line at their shops. At the Gold Bluff mine, Downieville, Sierra Co., where they have four Johnson concentrators, some very successful tests have been made with them. The superintendent writes that two machines did excellent work when they took the pulp from five stamps each. The tailings assayed a trace only, and that was so for several days when Mr. Johnson desired to run the pulp from the ten stamps in each machine. Assays of the tailings even then show wonderful close work.

All the exaggerated reports which were published about the Monterey at the time of her trial test have been thoroughly refuted by the action of the Navy Department. Irving M. Scott received a letter this week announcing that the vessel had been officially accepted. It is as follows:

WASHINGTON, June 22, 1893.

Union Iron Works, San Francisco, Cal.—SIRS: Referring to the Department's telegram to you of February 6th last, preliminarily accepting the armored coast defense vessel Monterey and to the report of the board appointed to conduct the final trial of that vessel, from which it appears that said vessel has fulfilled all the conditions of the contract and that no defects nor weaknesses in hull, machinery or fittings have been developed, and that the vessel has been completed in all respects except the fitting and securing of the side armor, the armored roof and sighting hood to both turrets, which will be done at the navy-yard, Mare Island, Cal., the Monterey is hereby finally accepted in accordance with the terms of the contract for her construction. H. A. HERBERT, Secretary of the Navy.

THE financial situation in this city is becoming easier now that collection day is over. The banks will probably give more accommodation after July 5th. It is not expected that the Pacific Bank will resume business.

Coast Industrial Notes.

W. A. FERGUSON has arrived at Bodie from Pittsburg. Mr. Ferguson is an electrician and will remain at Bodie permanently to look after the Standard Company's electric plant.

THE work of laying the Holly water system in Harford has commenced. The plant will be used for fire purposes only. A complete electric fire alarm system will also be put in.

THE Board of Trustees of the Reno Reduction Works, consisting of W. O. H. Martin, Henry B. Rule, H. H. Beck, C. T. Bender and Henry L. Beck, has appointed R. D. Clark superintendent of the works. A. B. Eastwood, a practical millman, has been appointed foreman and Harry Clark assayer.

WILLIAM BROWN accidentally struck an immense deposit of yellow ocher on his ranch near the North Pacific Coast Railway, not far from Santa Rosa. The deposit extends over the area of several hilltops, with only a thin covering of soil. The railroad company built a side track and a mill is being erected The first shipments will be made during the month of July.

ONE of the largest transactions of the Northwest, namely the transfer by the Tacoma Light and Water Company of their entire plant, valued at $2,000,000, to the city of Tacoma, was completed last week. The city now controls all the water and lighting rights, and supplies the entire city, private and public. C. B. Wright of Philadelphia has purchased $1,750,000 worth of the bonds.

GRASS VALLEY, Nevada county, has no complaint about lack of money in circulation as most places have just now. The mines are looking well, and the young prospects which have been started with outside capital show up very encouragingly. Grass Valley is just beginning to receive the impulse of outside aid in developing its mines, and the town is about to enter upon a period of prosperity not heretofore enjoyed. As this is the center of the gold-mining industry of California, the indications are good ones.

IT IS estimated that there are now in stock in this State 16,500,000 gallons of wine. Wine has been shipped out of the State during the last six months at the rate of 1,100,000 gallons a month, and the local consumption is about 500,000 gallons monthly. On this basis there will be on hand when the next vintage commences about 10,000,000 gallons. This is the smallest stock on haud at the commencement of the season for any year since 1886, and the outlook for good prices is therefore excellent The yield for the season is estimated at from 13,000,000 to 15,000,000 gallons.

THE "vaporite" Belvedere is a new excursion boat, the largest and finest of its kind ever built on the coast, and was launched from Geo. W. Kneass' Potrero yard on Wednesday, June 28th. The Belvedere is 15 20-100 net tons register, length 45 ft. 6 in., beam 9 ft., draught 3 ft. 6 in. Her cabin is 33 ft. long and will accommodate 50 people; it is all glass, having no less than 29 windows which can be raised or lowered at will. The motive power is a latest improved double cylinder 17 H. P. Union vapor engine The new boat, in addition to a daily trip to Belvedere will make night trips between this city and Belvedere and Sausalito. She will also run between San Francisco and Oakland, at the night hours when the regular ferry boats are not running.

THREE TEAMS, hurdened with copper matte, arrived Tuesday from the White Cloud smelter, says the *New Era*. The matte made a carload and has been shipped East to the electrolytic works at Ansonia, Conn., where the refining will occur. The opinion prevails that the White Cloud copper will prove to be of extra quality. This is the first copper matte shipped from Nevada within our recollection, though large quantities of copper, in the form of ore, have been shipped, the largest output being that of the Battle Mountain Copper Company, 15 miles south of the railroad at Battle Mountain, which produced sufficient metal to enable the English owners to declare dividends of $500,000 after paying transportation charges on the ore to Swansea, Wales.

A DISPATCH from San Diego says: This morning a letter came from the Colorado River Irrigation Company at Yuma that relates to the directors of the San Diego and Phœnix railroad. It offers a free right of way through the Algodones land grant on the Arizona side of the river. The letter adds that as soon as the railroad people decide on where to cross the Colorado, and locate from there their line to Yuma, the irrigation company will issue a right-of-way deed. It is said the company proposes to build a large canal from Yuma to the Mexican line, a distance of 22 miles, and border it with fruit trees and a boulevard. Should the railroad cross the river at that point, it would run along the bank of the canal, and it could have either side of the canal it preferred, and the irrigation company would grade the 22 miles of roadbed and give it to the railroad ready for the ties, free of cost.

B. W. BROWNE, of Washington, D. C., who is general manager of gold mines in Mojave county, A. T., 26 miles northeast of the White Hills district, is here to purchase a plant of machinery for the development of his property, including hoisting works. Mr. Browne has been mining there for some time and is much gratified at his success. He is milling gold ore that runs from $42 to $50 a ton. He has also secured a good supply of water, and will in future be able to push work on his mine more rapidly than ever. "A loss of much importance to us," said Mr. Browne, "was the burning of the mill recently of the O. K. Mining Company. This mill cost $60,000 or $70,000, and was being successfully operated. From the entire region about there, which is known as the Gold Basin district, they were getting out gold ore." Mr. Browne will take his machinery to Arizona in a few days.

THE settlement between J. Kirk Firth and his creditors has been completed and the terms upon which the embarrassed mechanical engineer will be permitted to continue his business have been determined. Firth's total liabili-

ties, incurred in the Phœnix Iron Works, amount to $80,-032.31. His assets are as follows: Book accounts, $15,-590.06; unfinished work, $2500; machinery and tools, $30,-000. There is a chattel mortgage of $26,500 on the plant of the iron works. It is held by Firth's father-in-law. There are also mechanics' liens amounting to $2424.40. The terms upon which Firth will be allowed to settle were upon a basis of 40 cents on the dollar. Ten per cent of his indebtedness must be paid within a year and 15 per cent in each of the following years completing the amount. He has given his notes without security upon these conditions, the date upon each being June 1st. On behalf of the creditors, William P. Sullivan Jr., of the Pacific Rolling Mills, and Oscar Lewis, have been appointed a committee to receive the payments and distribute proportionately to the creditors.

Mines of Humbug, Siskiyou County.

TO THE EDITOR:—I visited the mines on the head of Humbug last week, and prior to my visit I heard many discouraging reports in regard to the quartz mines there, from what I know now are unreliable sources. I was told that there were no well-defined ledges nor permanent mines in the district, and that it did not amount to anything as a quartz camp. This, however, is false, for the mines of Humbug compare favorably with those of any other district in California considering the amount of capital that has been invested there and the development work that has been done. The following statement of facts gleaned from visiting some of the leading mines in the district will give the reader an idea of what the mines really are:

Cartright & Phillips' mine was the first that I visited. This mine is situated on the north fork of Humbug and is an east and west ledge dipping to the south. The ledge has an average width of two feet and is incased in seynite walls. The pay chute extends over 300 feet on the ledges as far as it is opened out. There is about 12 inches of high-grade ore and from 12 to 14 inches of low grade in the pay chute.

What rock has been milled from the mine gives a return of from $45 to $48 per ton for the high grade and from $6 to $12 per ton for the low-grade ore. The lowest level is down 300 feet on the ledge, which makes it about 200 feet on the perpendicular. The depth of the first level is 100 feet and the second 100 feet lower. The ledge is opened up 375 feet on the lower level, which is tapped by a working tunnel 300 feet in length. But very little stoping has been done in the mine and only a small amount of ore has been taken out, the owners, Messrs. Cartwright & Phillips, having turned their whole attention to developing and opening the mine.

I next visited the North Star or Boyle mine, situated also on the North Fork of Humbug, about three miles from Cartwright & Phillips' property. This mine is on a north and south ledge, at an altitude of 4000 feet. It is opened up to a hundred-foot level, and a crosscut to tap the ledge 230 feet below the 100 foot level is now nearly completed. The pay chutes in the mine are extensive and average about 18 inches in thickness, the ore being high grade. The ledge averages about two feet and is incased in porphyry walls. Mr. Boyle is working a full force of men, and the mill, which consists of a four-stamp battery and a Huntington mill, is kept going most of the time night and day on the output of ore from the mine. Mr. Boyle has the well-known Spencer mine, which is situated near the North Star, bonded, and will commence opening out a new body of ore shortly. This mine produced over $100,000 for its former owners in less than three years.

I next visited the Oro Grande and the Hunt mine on the Middle Fork of Humbug. Messrs. Coulson & Thrash, the owners of the Oro Grande, are both practical and experienced miners and are developing their mine in a workmanlike manner. It is a north and south ledge, incased in a porphyry hanging and a hard limestone foot-wall. The ledge averages 29 inches in thickness and is high-grade rock. They have tapped the ledge with a working tunnel at a depth of 150 feet, and are now drifting from it each way. From all indications it promises to become a big paying mine.

The Hunt mine is also a north and south ledge and is situated below the Oro Grande on the Middle Fork of Humbug, near the creek. This mine does not possess one advantage that all of the above-mentioned mines do, viz., that of being worked by tunnels, consequently it necessitates the extra expense of hoisting and pumping. There are two levels in this mine, the deepest being 140 feet. The drifts extend 65 feet on the lower level on either side of the working shaft at present, but are being driven farther ahead as rapidly as possible. The ledge is incased in porphyry wall and has an average width of 18 inches, and is all high-grade rock. A rich body of ore was struck a few days ago in the north drift that exceeds anything that has yet been found in the mine. The mill, which is situated at the mine, is kept going most of the time.

I visited some prospects also in this district that bid fair to develop into good-paying properties, and, taken as a whole, the prospects for a bright future for it are flattering, to say the least. ALEX. QUARTZ.

Yreka, June 21, 1893.

Miners' Wages.

The MINING AND SCIENTIFIC PRESS predicted some months ago that a much further decline in the market value of silver would be followed by a reduction in the wages of miners. Quite a number of mines had already shut down before the present crisis which were unable to continue paying the ruling rate of wages. This was one of the prime factors in the shut down of the Bunker Hill and Sullivan and other mines at Cœur d'Alene, Idaho, some weeks since, though little was said of this feature. Now, one of the largest mine owners in Colorado says that unless the miners who have been receiving $3 per day will accept two-thirds of that, he will have to close all his mines. At Butte, Montana, the mine owners are discussing a $3 rate instead of the prevailing one of $3.50. The Miners' Federation, recently organized, will doubtless resist this, and the result will be that the mines will stop work. Mine owners who would gladly pay the present rates if possible, cannot do so at ruling rates of products, and must stop work unless there is a change. They claim that this is the only alternative. The miners must decide this matter for themselves.

Quicksilver Mining Suit Decision.

The big mining suit of the Altoona Quicksilver Mining Company vs. the Integral Quicksilver Mining Company, which has been on trial in the Superior Court of this county since May 31, was brought to a close last Wednesday, says the Trinity *Journal*. The jury brought in a verdict for the plaintiff. This action was the most important that has been brought in the county for many years, if not the most important ever brought here. It was brought to determine the right of possession to the Central Quicksilver mine, in the Cinnabar mining district, and many nice law points were involved in the case. Every legal proposition advanced by either side was stubbornly contested and exhaustively argued. The trial lasted 19 days and was replete with interest. The case was so ably conducted by both parties and the ability of the counsel was such that the usually dry materials of a civil action became intensely interesting.

In May, 1892, the Integral Quicksilver Mining Company filed its application for a patent to the Central mine, in the Land Office at Redding. On the 18th of July, the same year, the Altoona Quicksilver Mining Company filed an adverse claim at the Land Office for the same piece of property, and on August 16th filed its complaint in an action to determine the right of possession to the same.

The cause came on for trial on the 31st of last month. A jury was impaneled and sworn, numerous witnesses were examined and much documentary evidence introduced. The plaintiff rested its case on the 16th inst. and defendant closed on Monday.

Argument began Tuesday morning, Hon. T. W. H. Shanahan opened for the plaintiff, and in an able argument presented the plaintiff's side and made an exhaustive review of the testimony and the facts of the case. Mr. Shanahan is an able and forcible speaker and held the close attention of the jury.

In the afternoon G. D. Reid, Esq., replied in an exceedingly well-chosen and logical argument, thoroughly covering every point presented by him. He spoke in an earnest and impressive manner and made every point with skill and effect. In close reasoning and proper arrangement of the issues it was one of the best speeches of the trial.

He was followed by Ex-Senator Reddy, also for the defendant, in one of his characteristically powerful and analytical arguments. Mr. Reddy addressed the jury for over two hours, and when he had finished the defendant's case was clearly and ably presented—nothing omitted and nothing slighted.

Wednesday morning Senator Ford closed for the plaintiff in a most eloquent speech. The Senator has the gift of oratory in a high degree and for an hour and a half entertained a crowded courtroom. It was a splendid and effective effort and was highly appreciated.

In the afternoon Judge Jones read his instructions to the jury, who, after a deliberation of about three-fourths of an hour, brought in a verdict for the plaintiff.

The Altoona Company was represented by Hon. T. W. H. Shanahan, Hon. Tirey L. Ford, District Attorney Bartlett and H. R. Given, Esq. D. G. Reid, Esq., and Hon. P. Reddy appeared for the defendant.

Boring Machinery for Prospecting Gravel Mines.

In the PRESS of last week mention was made of the method of prospecting drift claims on the Forest Hill divide with an artesian well boring apparatus. We have since been informed by Mr. Chappelet, president of the Mayflower Mining Company, that the fourth hole is run down 250 feet and is being sunk at the rate of 10 feet per day. During this sinking the drill has passed through considerable "nigger head," what all miners know is difficult to bore through. There has been no trouble with this, however. The expense of this boring is a trifle less than $2 a foot with four men working two shafts. It is proportionately less for deep than for shallow holes on account of less frequent occasion for moving the derrick, tools, etc. Mr. J. O. Jones, the superintendent of the Mayflower mine, under whom this work is being done, is an experienced miner, having formerly held a similar position in the famous Bald Mountain drift mine in Sierra county and the Morning Star mine in Placer county.

In this connection it may be stated that the American Well Works of Aurora, Ill., who make a specialty of artesian well apparatus, have lately issued a large catalogue illustrating and describing the various forms of apparatus used for different conditions of work. It will surprise one not familiar with the subject to see to what extent this branch of manufacture has grown. The catalogue is practically an encyclopedia of well boring apparatus, with descriptions and instructions for operating. There is a great variety of "rigs" adapted for all kinds of work, large and small. They make not only drilling machinery, but steam pumps and valves, windmills and farm pumps, ditching machinery, etc., and have such a variety that they have four complete and separate exhibits at the World's Fair.

IT is reported that the Arizona mine of Unionville is soon to be sold to the same parties who bought the Blackhird mine of Central. If this report be true, Unionville, the town which was at one time the county seat of Humboldt county, and which had over 1000 inhabitants, will again see better days.

Nevada Minerals at the Fair.

A Chicago correspondent says that no space has been reserved for Nevada's exhibit at the World's Fair, the State having waived all rights to any recognition owing to the fact that the Legislature in 1891 refused to make an appropriation. The United States Commissioners, however, prevailed upon the chiefs of several departments to reserve space, hoping to raise a sum through private sources sufficient to make a small display and have the State represented. In this, however, they failed, and it looked as though Nevada would be the only State not represented. The space thus allotted could not be retained after September 1, 1892, and was withdrawn.

The action of the last Legislature appropriating $10,000, although at the eleventh hour, was received as encouraging news by the director-general and chiefs of departments, and they showed their appreciation by rendering to the State all the assistance in their power, with the result that the State exhibit is located in four departments. Unfortunately, the principal industry is not displayed to the best advantage. Instead of having a prominent space on the main floor of the magnificent building of Mines and Mining, where an exhibit could have been made that would have challenged the world, the display is virtually on the west gallery in the mineralogical department, occupying a space of 2037 square feet.

The State is well represented with a display of choice minerals. One large case is devoted to the ores of the Comstock, showing the character of the ore obtained from every mine on the lode, including a bunch of Savage ore taken from the 3200-foot level, the deepest point from which ore has been extracted in the world. All the mining districts in the State are represented. The gold ores are quartz, wire and placer. The silver ores include ruby (one piece weighing 108 pounds, from the celebrated Manhattan, at Austin, assaying 7000 ounces to the ton), black metal, native, wire and horn.

Besidss, there are splendid specimens of lead, galena, antimony, iron, nickel, cohalt, tin, copper, cinnabar, manganese, zinc, salt, borax, soda, sulphur and mineral soap. There are also specimens of garnets, viriscite, tourmaline, agates, rough amethysts, onyx, marble of different grades and building stones.

White Pine sends a special exhibit of rich silver ores, which was sent on and maintained by Wren & Grandelmeyer. The Morrison & Snyder special exhibit from Eureka, valued at $30,000, is one of the finest private exhibits in the building and attracts a great deal of attention.

On the east gallery, in section 48, a display of sodas, borax, silica and salts is placed in competition with the world. This exhibit shows the products named and their native states as taken from the marsh, comprising borate of lime in mud, cotton balls, tincal in mud, tincal crystals, soda in a native state, trona, soda ash, soda crystals, salt in solution, table and dairy salt made by solar evaporation, silica in a pure state, as mined, and then all these things in a refined state, making the only display of a similar character in the building.

Washington Not Well Represented.

Few men but have a desire to kick at times. It is a bad habit, for it grows. But we want to register one kick and then subside. The opportunity to display the wealth of the forests of Washington at the World's Fair has been lost. It is too late in the day now for the commissioners to write letters, as is being done, and ask our lumbermen to send samples of lumber. It is too late to get sections of trees—in fact, it is too late to do anything but stand around the miniature farm now on exhibit in the Washington building, and try to imagine that it teaches or illustrates anything above the idea of a ten-year-old boy. It is worse than Horace Greeley's book on "What I Know about Farming"—in fact, nothing could be as weak as it is. Visitors laugh at it and sensible men advise throwing it into the back yard before any more see it. The forest exhibit is a failure, the agricultural exhibit is a failure, the mineral exhibit is a failure, but it has one redeeming feature. No one but an expert can detect the fact that not ten per cent of the ores shipped to Chicago from Washington are of any value. They were condemned before they were sent. The exhibit of our timbers was made a failure as far as possible by painting them to save finishing them in oil to show the grain of the wood. We are thankful they did not let some company, that would do it for nothing, give the handsomely carved seal a coat of asphalt. The idea of the commission seems to have been to get anything so it cost nothing—that is, excepting their own services. If the building could be locked up, and a notice stuck on the doors that Washington exhibits could be found only in Washington, we think that the good impression made by the exterior of the building and the big logs donated by our lumbermen would not be obliterated soon. There—we feel better.—West Coast Lumberman.

MINE BELL SIGNALS.—The MINING AND SCIENTIFIC PRESS, of San Francisco, issued as a supplement a copy of the new code of mine-bell signals which must be obeyed or the company may be subject to the penalty in such case provided. The PRESS says: "The system is not quite so simple as could have been wished, and many superintendents complain of its intricacy." The superintendents of Grass Valley district were bitterly opposed to the rules included in the bill when they were first published and used every means in their power to have the bill defeated. The mines of this district have a system of signals that has been in use for years and with which every man employed in or about the mines is familiar. To change these signals will cause considerable trouble and may result in serious mistakes being made, as our miners have been accustomed to the present signals for so long a time that it will be hard to make the change. But we suppose the law will have to be complied with and the new rules adopted.—Grass Valley Tidings.

The Great Northern Railway.

Some twelve or fifteen years ago a clear-headed, stout-bodied steamboatman of the Upper Missouri conceived the notion of building a railroad from the Falls of St. Anthony into the rich Red River country. He had no capital to speak of, but he had a big idea. It was to build, equip and operate a railroad *upon business principles*. He looked about him and saw that no such thing had ever been done in the United States, and he believed that when done it would break down and over-ride all competitors. The Northern Pacific Company had a line into the Red River country, but Mr. Hill—for it is "Jim" Hill that we are telling about—saw that it was heavily over-capitalized, that it was clumsily managed from the New York office, that its operating expenses were double what they should be, and that it was required to pay dividends on three times its actual cash value. Said Jim Hill to himself: "I will build a railroad from St. Paul to the Manitoba line just as I would build a house—that is, without fuss or feathers, under my own eye and for cash. The central office of my road shall not be in Wall street, New York, but right here on the road itself. The management will be vested not in a series of high-salaried general, special, assistant and department managers, but will be kept directly under my own hat. With me to lay out the plans and to direct the work, with one first-class lawyer to keep me advised as to the law, and with one first-class engineer to look after those parts of the business, we ought to get along very well." And thus was born the Manitoba Railroad.

Mr. Hill knew the country and he knew the transportation business. He went to the financial centers, laid the facts and his plans before the investors—and got the money. He then returned to St. Paul and built the road, built it as he had proposed under his own eye and for cash. There was no rosewood-lined general office in Wall street; there was no "Construction Company;" there was no vast "headquarters" at St. Paul filled with officers and clerks; there were no special cars filled with champagne and "magnates." There was, in fact, just plain Jim Hill under a broad hat and in top boots out at the front with his chief engineer, and both very hard at work. They bought the best material, and they personally saw to it that it was put down in the best way. They saw the engineering mistakes of the Northern Pacific line, and they avoided them. The work, performed under the master's eye, went forward with unprecedented vigor; and when it was done the railroad men of the country saw with amazement that it was shorter, that it had fewer curves, that it had lower grades, and that it had a better track and better cars than the N. P. line; and Mr. Hill made no secret of the fact that its total cost was about one-third of the former's "capitalization." And when it came to operating the new road the same principles of simplicity and economy were enforced. There was a little office and a few clerks, but the "President," the "Assistant to the President," the "Engineering Corps," the "General Manager," the "Assistant to the General Manager"—these and the hundred other titles with each of which ordinarily goes a man, a fat salary, a private car and a dozen secretaries and clerks—were all summed up in Mr. Hill, his engineer and his attorney. Out on the road there was only one man to do one man's work, one engine to do one engine's work, etc., etc.

Very soon the profits became large, and Mr. Hill saw that an easy way to make them larger was to build the road out West. To make the story short, he has kept on building West—all the while keeping the original idea in mind—until his road is now complete and in operation between St. Paul and Puget Sound.

Mr. Hill's road—he calls it the "Great Northern"—runs parallel with the Northern Pacific for two thousand miles, and from the day the first spike was driven on the former, there has been mutual jealousy and dislike. The Northern Pacific people have said that Hill was an adventurer and a fakir, and that his schemes would collapse and bankrupt everybody connected with them. Hill has said: "Wait and see. I will make a road straighter and better than the Northern Pacific line. It will cost not above one-third of the N. P.'s 'capitalization;' it can make money at half the rates charged by the N. P. When it is done I will put transcontinental transportation on a business basis, and within one year from the time I begin to haul through freight, the N. P. will be in the hands of a receiver."

That was five years ago. Mr. Hill's transcontinental road is an accomplished fact; trains are now running over it regularly, and last week a cut averaging about twenty-five per cent, as compared with Northern Pacific rates, was made on all classes of traffic between St. Paul and Seattle. Now the Hill road, built in economical times and by business methods, and operated by the same methods, can do a profitable business at the cut rates, but the Northern Pacific cannot. The latter has met the cut by an equal reduction, but it cannot run at this rate long without running into the hands of a receiver. The question now is, will Mr. Hill's desire for revenge lead him to stick to the cut rate, or will he combine with the N. P. in restoring the old rates. The pressure will, of course, be immense. All the other transcontinental lines are in the same boat with the Northern Pacific. If Mr. Hill puts rates down then they will all have to come down, and that means disaster, because they are organized on a basis which requires them to earn profits upon three times the actual value of their roads. It is a settled principle of railroad policy that there will be no prolonged competition where combination is possible; and it is therefore to be expected that the old transcontinental roads will make it an object for the Hill road to come into the combination to maintain rates. That, we fear, will be the end, though persons who know Mr. Hill say that he is in a position to force the fighting, and that he will not quit till he has driven his chief competitor to the wall and made the reduction a permanent one.

The real significance of the Hill road is the lesson it has taught the county concerning the matter of railroad building and management. He has demonstrated that the present method of building and operating railroads is extravagant and wasteful in the extreme and that it puts an enormous and unnecessary tax upon the country. He has shown that with lines of railroad rightly built and rightly conducted there is good profit in the transportation business at one-half the rates now exacted.

We have all along contended that nobody begrudged to the transportation companies a fair rate of interest upon their investments. But the country does begrudge the payment of rates calculated to yield interest on two or three times the actual value of railroad investments.

In a little book on American railroad investments, written by Mr. Van Oss, an Englishman, for the information of English investors in American railroad securities, we find a thorough review of the ways in which railway "capitalization" is piled up. "In the main," he says, "there are six different ways of inflating the capital of American railways," as follows:

(1) "By fraudulent issues of bonds and shares as a downright swindle for speculative purposes." Example: "Fisk and Gould increased the share capital of the Erie road between 1868 and 1872 from $17,000,000 to $78,000,000, mainly to manipulate Wall street." (2) "By paying too much for construction." Example: "The South Pennsylvania Railroad has been proven to have cost actually $6,500,000, and a responsible contractor had offered to build it at that price, yet a construction company composed of Vanderbilt's clerks received $15,000,000 to complete it, and the syndicate of capitalists which supplied this money got $40,000,000 in bonds and shares, so that for every dollar of actual cost over $6 of bonds and shares were issued." (3) "By purchasing properties at excessive prices." Example: "The Coal and Iron Company of the Reading affords one of the most famous cases, this concern being paid for, it is said, at the rate of at least twice its intrinsic value. Years ago it was a common thing for railroad directors to buy up property in their private capacity and then sell it to their company at an immense profit, and until 12 or 15 years ago the majority of purchases of auxiliary concerns used to be with fraud." (4) "By buying superfluous competing lines." Example: "The Pennsylvania had to arrive at a compromise with Vanderbilt, resulting in the construction of the South Pennsylvania road being suspended, if it wished to see its monopoly maintained in Pennsylvania." (5) "By selling bonds and shares at a discount." Example: "The New York Central, Erie, Reading, St. Paul, Chicago & Northwestern, in short almost every railway company, as a rule, receives nothing for the earlier issues of its ordinary shares, although, as is well known, shares are no longer given away, and frequently sell at good prices." (6) "By declaring stock dividends." Comment: "The fictitious capital resulting from the payment of stock dividends amounts to a sum second only to the inflation caused by the sale of securities at a discount." Example: "The most famous stock dividend ever distributed was one of 80 per cent, paid in December, 1868, on the shares of the New York Central Railway Company, and 11 months later, when the consolidation of the Hudson River Railroad followed, a further stock dividend of 27 per cent was declared, while the Hudson River Railroad shareholders received one of 85 per cent."

Taking all these methods together, Mr. Van Oss reaches the conclusion that for $4,650,000,000 of railway stock now in existence, the original investors certainly paid not more than $465,000,000, or ten per cent of their face value, "and probably less." Hence, railway stocks paying 1.8 per cent on their face value "return at least 18 per cent per annum upon actual investment." Mr. Van Oss, it may be said, is the very opposite of a radical, and justifies all this watering of stock, because "by inflating capital the railroads conceal the profits and thwart the designs of rate-reducing railroad commissioners."

If the evil of this inflation of railway "capital" affected only the holders of railway stocks, there would be little reason to complain; but in reality it affects the stockholders less than it does the general public. The capitalization of a railroad, fraudulent though it be, is made the basis of transportation charges. For example, if a railroad is "capitalized" at $50,000,000—no matter what its real value—it is required to earn money enough to pay current rates of interest on fifty millions after all the costs of operation are discharged. With these facts in mind, the reader will easily comprehend why the Jim Hill road is such a disturber of the peace of mind of the railroad world. Here is a road complete and as good as its rivals, but capitalized only at its actual value, or less than half of any other transcontinental line. It can make good profits with half as much business as is required to support the Northern Pacific, as it can carry double the amount of freight for half the present rates. It is likely to make revolution in the railroad capitalization of the country—at least it ought to open the eyes of the public.

RUSSIAN DEVELOPMENTS.—A want which has long been felt in Siberia is in a fair way of being satisfied. It is proposed to establish a school of mines at Irkutsk, for the purpose of educating mining engineers and metallurgists, with the ultimate view, in connection with the construction of the Trans-Siberian railway, of greatly developing the exploitation of the mineral deposits of Asiatic Russia, especially the auriferous beds. In contradistinction to this progressive movement, however, it is announced that the Czar's Government has decided to close three State mines and works in the Altai Basin yielding and treating argentiferous ore, namely, those at Barnaoul, Pavlov and Loktev, respectively; but the districts will probably not be a great loser thereby, as the land has been let on long lease to private individuals for the establishment of sugar-mills, distilleries, etc. The development which is, however, most likely to interest manufacturers is the formation, with a capital of 1,000,000 roubles, of a company at Kharkov with the object of assuming the proprietorship of, and considerably enlarging, a certain foundry and engineering works in that town, and manufacturing agricultural implements and machinery on an extensive scale. The new concern, which is styled the Heldevich-Sade Company, has already opened depots at such places as Poltava, Krementchug, Rostov-on-the-Don, and Armavir.

THE excitement over the tin discoveries, eight miles to the southeast of Lovelock, Nev., has quieted down, awaiting a better knowledge of tin ores. Tests are being made of the character of the ores found.

Working Ores in South Africa.

A correspondent of London *Machinery*, writing from Johannesburg, South Africa, has this to say about affairs in the Rand: In criticising a paper on gold amalgamation by M. C. Warnford Lock, a correspondent writes: "Mr. Lock and many other would-be reformers of practice are on the wrong tack altogether. They are trying to find an apparatus which with one crushing and one amalgamation will save the maximum amount of gold. According to all sound analogy and experience they will never do it in the world. Successive operations, beginning with relatively coarse crushing and ending with the treatment of slimes, are necessary to maximum economy and efficiency of extraction. This was found out long ago, and the contrary proposition, which begins to be agitated again, is simply the revival of an exploded error." It is pleasing to hear a recognized authority saying precisely what I have maintained over and over again, and which has been more than once referred to since. It appears to be the very perfection of bad practice to reduce ore to a minute grade at the outset, when there is no necessity for it, and then endeavor to mend the mistake by the use of an inverted process.

The slime separators at the mill belonging to the Salisbury and Jubilee Companies are doing such successful work that Mr. Hennen Jennings is preparing plans for their erection inside the cyanide works themselves, so that each set of vats (four) belonging to the two companies will have its own separatur placed over them in the center. In this way the tailings will run directly from the elevator wheel to the cyanide works, and, being freed from the slime in the separators, will at once pass into the vats, so that there will be no handling of the stuff at all until the solutions have done their work. This method will cost nothing, and will be, therefore, a great saving over the present one. The filling of the vats directly from a separator has already been tried, and has been shown to be quite practicable. Mr. Burrowes, late of the Robinson, has general control at the mill and cyanide works.

It is satisfactory to note that shortly the use of electric light and rock drills will be almost universal on the Rand. Where they are not now in use, work to supply both has either begun or is in contemplation. They are recognized as almost as necessary as a good water supply. The harder the rock the more useful the drill; its work, compared with the work by hand, is phenomenal, being almost as five to one. The work of training men to the use of rock drills is proceeding satisfactorily, for, as was said by me a short while ago, their utility depends as much, if not more, upon the use by capable men than upon the machine or its maker.

Almost every day the mining world is offered a new process for ore reduction. This is particularly the case out here, where the assays of ores show the presence of silica, alumina, zinc, silver, lead, sulphur, iron, copper, antimony, manganese and arsenic. The latest process of the kind which is to be introduced is called the Russell process. It consists in roasting, and after treatment by leaching in a special solution that is highly effective in dealing with the singularly refractory ore, 87.57 per cent of the gold is extracted, besides saving the lead and other baser metals. The inventor hails from Utah, where the fame of the Rand seems to have lately penetrated.

Here is yet another process already referred to more than once in the columns of *Machinery*. Although very little is heard of this process at present, Mr. Turton is quietly completing his arrangements at the works on the old Isabel mine, south of the Main Reef G. M. Company's ground. The vats have a capacity of treating 25 tons a day. It has been stated, and to some extent believed, that while Mr. Turton's process was capable of extracting practically all the contained gold, the process of precipitation was defective. This is erroneous, for, as a fact, although there is still something to be perfected, the gold is precipitated in almost a pure state, equal to a value of at least £4 per ounce. He has also been able by a simple addition to reduce the cost of working considerably, and at no very distant day there is likely to be a considerable stir in the mining world as to the simplicity and cheapness of his process. Of course the manufacture of sulphuric acid in the vicinity will be a matter of considerable assistance. The chief benefit of Mr. Turton's process will be in the immense saving in manipulating ore. It can be treated when crushed to the size of a marble, and roller mills will only be necessary. On leaving these the bruised ore can at once pass into the vats and come in contact with the solvent. By this means the use of plates, concentrators, and the accumulation of tailings containing gold will be avoided, Mr. Turton claiming for his process that the stuff after leaving the leaching vats is of no further value. It will be seen that if this is done only one hauling will be necessary, as against two or three with other processes, which necessitate very fine crushing or the treatment of tailings. In all probability the secrecy of the experimental stage will soon give place to publicity, and to a practical demonstration of the gold won that will probably have a favorable effect on Rand mining. A Turton's plant, I am informed, is to be erected and worked on the Black Reef, where, as is known, the ore is very highly charged with pyrites.

MINES IN THEIR RELATION TO EMPIRES.—Prof. N. S. Shaler, in *Donahoe's Magazine* for June, says: "The influence of mineral resources on the development of commerce, and, secondarily, on the paths of conquest, is evident even in the early history of Europe. Thus, to take but a single instance, access to tin of Cornwall evidently did much to favor the development of the Phœnician people. It was clearly an element of importance in the influences which led the Greeks to the western parts of the Mediterranean; it developed trade routes by the way of the sea to Britain, and across France from Marseilles to the ports on the British channel. Still further, the knowledge thus acquired appears to have directed and induced the Romans to that conquest of Great Britain which, though temporary, endured for centuries, and had a lasting influence on the

history of our race. From this ancient time to the present day, the paths of conquests, both of commerce and of arms, have, among civilized peoples at least, been to a great extent directed hy the desire for mineral wealth. The last great conquest nf this generation, and which gave to Germany the provinces of Alsace and Lorraine, though it may appear in history as a matter of pure politics, had for its final purpose the transfer to the cooqueror of the only valuable coal fields which France possessed. The results of this change may, in the tlme to come, be most momentous."

The California State Fair of 1893.

The fortieth annual State Fair of California will be held at Sacramento September 4th to 16th ioclusive. The premium list just issued contains classified awards amounting to $20,000 in cash for agricultural, mechanical and industrial exhibits. These annual exhibitions have been most successfully managed by the State Agricultural Society for the past 39 years, and it is the intention of this society to give the public a progressive exhibition for the current year.

The producers of California demand these annual exhibitions to assist and stimulate the various industries of the State, and notwithstanding the counter attraction of the World's Fair, find it essential tn cater to local trade. Consumption of home products still continues and the farmer and manufacturer must have opportunity to show what is being accomplished within the confines of nur most productive State. Not to do so would invite stagnation of trade and subsequent inattention to our productive qualities. Hence it is quite necessary that unusual efforts must be put forth this year in all the various branches of trade and commerce to prevent depression and encourage the sale of home productions.

There still remain thousands of acres susceptible of culture of many uodeveloped agricultural resources, the sale and cultivation of which would not only give us increased population, but permit the investment of money that would give most satisfactory returns to investors with great benefit to the State as a whole. Increased opportunities for production means additional facilities for the use of our circulating medium, thereby giving an impetus to all kinds of trade.

California's chief industry being agriculture, she must continue to advance it in every possible way. Failure to show her productive qualities one season would give the impression abroad that her capabilities are on the wane, whereas no greater progress in soil culture is being made at the present time in any part of the world than in this State.

The merchant, when trade is dull, inaugurates different plans for stimulating business. The farmer would do well to follow his example, and when crops are short and prices depressed, he should show unusual exertion in keeping his industry conspicuous hefore the people, lest the outside world would he led to believe that agriculture in this great State had retarded.

Periodical set-hacks occur in all branches of trade, and hut for the activity of the merchant, would be a standing menace to investment. This state of affairs is overcome in many instances by his efforts to stimulate, and success appears in many cases where failure is most apparent.

It therefore behooves the agricultural community of California to make an unusual showing this year at the State Fair; a meager one would be disastrous to our World's Fair exhibition, as the effect would tend to signify onr productions as there shown were unusual.

The premium list as offered by the State Agricultural Society contains sufficient cash awards for agricultural products to warrant the various counties in making up a representative display of their varied soil productions.

To the manufacturers of California we would say, as a means of promotion of your interests, a general exhibit by factories should be made at the State Fair of 1893.

There is at the present time a growing feeling in this State towards the advancement of our manufacturing interests, occasioned by the prospective development of our most available but heretofore unused water-power, which promises, in conjunction with the modern use of electricity, to give us what has in the past been the most important drawback to this iodustry, cheap motive power. A little agitatioo at this time of the interest would be most effective.

Therefore, extraordioary efforts should be made to show some of our established plants in operation at a State gathering, not ooly as a means of encouraging trade, but as a matter of inducement to capital to invest, as there are many factories that could be increased by the use of additional capital now that a cheaper power will soon be available.

The representatives of other States are here each season to display manufactured goods. They readily recognize the value of this agency to reach the consumer. Local manufacturers should not permit those from distant States to meet their trade without an equal showiog of their ability to supply this trade.

Exhibitors at the annual State Fairs of the past are familiar with the advantages to he derived by an exhibit of their products; to those unfamiliar, we would say:

The great State Fair of California has been held for 39 consecutive years, and is thereby valuable as ao introductory agent by reason of Its established permanency.

The Califoroia State Fair offers cash awards for State products amountiog to $20,000 annually.

The California State Fair includes an exhibition of a most varied nature. The display of blooded stock is a most conspicuous adjunct to the great show of agricultural and Industrial products that each season congregates in the largest exposition building on the Coast.

The Califoroia State Fair Speed Department holds its usual prestige as an attraction for the multitude who desire to witness the equine cootests as an amusement, to say nothing of the exhilarating effect of this out-door sport. It has been a most important auxiliary in attracting visitors who are sure to examine during odd times the products of California as shown in the different departments.

The awards of the California State Fair are of much benefit to exhibitors, as competition is great, and merit here recognized is surely to be recognized in trade.

The California State Fair of 1893 will be provided with extra attractions for visitors. Its great success in the past emboldeos the management to keep abreast of the times, and the demands of progress is sure to attain additionat benefits for exhibitors.

The annual attendance at the State Fair aggregates 50,000 visitors, thereby offering advantages not to be found elsewhere on the Coast for the producer to meet the consumer.

This opportunity in the past has been readily recognized by all concerned, and it is expected that increased efforts will be made this year to show most fully the manufacturing as well as the agricultural resources of California.

Collection of intending exhibits should begin at once.

Applications for space and all question for information will be immediately answered hy the secretary.

EDWIN F. SMITH, Secretary

An Ideal Nevada County Mining Town.

The canyon of the South Yuba is always grand and beautiful, though in some places it is grander than in others, says the Nevada *Herald*. But from the lower foothills to the river's headwaters the canyon is worth seeing, and every curve of the stream presents some new delight to the eye. To the tourist who goes for the first time to the town of Washington, the first glimpse of the canyon is a revelation. The hills are as high as those of Yosemite, and "as steep," as a prospector expressed it, "as the trail to heaven." They are grand and majestic, in places covered with a dense growth of timher, but for the most part rocky and sparsely timbered. The noonday sun beats down on the rocky hillsides, and the outline of the largest pine and the smallest chaparral is boldly drawn on the blue serpentine rock which lies everywhere.

For over four miles the road winds down the steep declivity from the top of the ridge to the river. In places it is so narrow that a man on horseback could not pass a stage or wagon. Following the road down the top of a sloping ridge, the traveler suddenly crnsses the same and finds himself on a jutting spur where he seems to hang between earth and sky. Above him are the blue heavens—below, 2000 feet or more, the crystal waters of the South Yuba are leaping and bounding over the rocks, and roll away out of sight down the winding canyon. It is a grand sight, almost equal to Cape Horn or any spot on the American river.

We drive carefully now, and after a few turns around the rocky cliffs the little town of Washington appears in sight, almost directly below. It is a pretty spot. A little flat in a deep basin of the canyon, where white cottages can be seen through the green trees, and just across the river lies a green pasture and an orchard. A few more turns and we are down on the flat, and drive through the only street the place boasts of, up to the hotel door, where we are warmly welcomed by the best-natured landlord in the mountains.

The town itself is an ideal California mining camp—such a place as Bret Harte may have lived in when he wrote his tale of "Roaring Camp." All the characters of Harte's book can be duplicated here, and here can be found the broad plaza or street, its low houses, its clear and sparkling water. The men who lounge about the shaded porches have been here for 10, 20 or even 30 years, and many a story cao they tell of the days when the camp was flush, and hundreds of men were at work in the deep canyons hereabouts. But the river still roars as of old, the pack-trains of diminutive hurros are stlll seen on the plaza, and the arrival of the daily coach is as much of an event as it ever was, and so the old boys are content to live and die in the old camp.

DEMAND AND SUPPLY.—When aluminium manufacture first began in this country on a commercial scale only a few years ago it was stated that the price of the metal would always remain high because of the necessity of importing the bauxite, from which it is extracted, from Germany. Improvements in the processes of extraction and reduction have resulted in a decrease in price from that at which it was first sold, but one of the chief factors was the discovery of almost inexhaustible deposits of bauxite in Alabama and Georgia. According to "The Mineral Industry for 1892" the imports of bauxite in 1889 were 28,945,674 pounds. After the discovery of the Alabama deposits and mining began, in 1890, the imports were 27,503,730 pounds. In 1891 imports fell off to 17 936,504 pounds, and in 1892 a still further decline to 12,804,253 pounds, or about 44 per cent of the imports of 1889. The demand for bauxite, as in many other instances, induced mineralogists to search for It, and it was soon found. The same results are already heginning to be noticeable regarding tin.

MINERS DON'T LIKE IT.—A resident of New York, who passed nearly 25 years in the anthracite coal mines of Pennsylvaoia, says that few miners easily shake off the horror that seizes a man upon fioding himself alooe at the the hottom of a mine, with the knowledge that there is no other human heing within call. It sometimes happens that a miner, ahsorbed in his work, suddenly realizes that all hut himself have gooe. The place is as safe from ordinary accidents then as at any time, and no other living creature more dangerous than a blind mule shares the miner's solitude, but he finds it impossible long to keep off the pressiog terror, and, half ashamed, hut completely conquered, he picks up his dinner pale and gropes his way to the upper air.

A GIGANTIC SAW which has been made for the armor plate department of the Homestead mill, Pittshurg, will cut nickel steel armor plates ranging from eight to thirty-eight tons, and sometimes 29 feet long and 20 inches thick, as easily as an ordinary saw will cut a plank. It is said to have cost something like £7,000 and weighs 110 tons.

What Supervisors Can Do with Game Laws.

As reported in the *Chronicle*, Attorney F. P. Deering has filed with the Fish Commission his opinion as to the powers of Boards of Supervisors in the several counties to pass ordinances relative to fish and game. The question recently arose on accocnt of dissatisfaction caused by the new general statute, whlch makes the open season for deer from September 1st to October 15th. At that time of year in all the coast counties the deer were "running," thereby rendering their meat poor and almost unfit for food. It was desired to learn if the Boards of Supervisors had power to change the date of opening to July or August 1st without, however, extending the time during which deer may be shot in any county beyond six weeks. Attorney Deering decides that the supervisors have such power, much to the satisfaction of sportsmen in this part of California and, in fact, throughout the entire State. From the attorney's opinion it appears that such power as the supervisors have over fish and game they derive from subdivision 29½ of Section 25 of the County Government bill and from Section 636 of the penal code. These provisions are parts of acts re-enacted at the last session of the legislature. From all the provisions of law, Mr. Deering draws the following important conclusions:

"First—With respect to fish, I consider it clear that the supervisors have no power to pass any ordinance either as to the close season or as to nets and seines that is in conflict with the general laws of the State upon the subject. Section 29½, above quoted, authorizes supervisors to make regulations for the protection of fish and game, and says that when regulations are made relating to game, not fish, the laws of the State are suspended in that county. The regulations made by supervisors for the protection of game are declared to supersede the State law, but the same declaratinn is not made as to fish. The supervisors may make regulations for the protection of fish, but such regulations do not suspend or take the place of the State laws. As to fish, the local ordioances must be consistent with the general laws. The plain construction of this provision of the County Government bill is that, while supervisors are authorized to make regulations for the protection of fish as well as of game, as those regulations are declared to suspend the State law only in respect to game, they cannot suspend them as to fish. Therefore, the State laws as to fish remain in full force, and local ordinances must be consistent with them. That this was the intention of the legislature also appears from Section 636 of the Penal Code.

"Supervisors may shorten the open season for fish, but they cannot lengthen it. Again, supervisors have no power to authorize the use of a net or seine with less than a 7½-inch mesh. They must act in harmony with the State law, which makes it a misdemeanor to use for catching shad or salmon a net or seine with meshes less than 7½ inches in length. Supervisors are not given power to make regulations as to nets and seines that will supersede the State law. The only instance in which their ordinances have this effect is when they relate to the protection of game, and this is for the reason that the very law giving the power to pass the ordinance as to game says that the State law shall be there suspended.

"With respect to game, I am of opinion that to protect the game itself supervisors may make regulations which shall take the place of the State law, and, shonld the needs of the county require a longer or a shorter or a different close season, the supervisors may prescribe this also. It must be borne in mind, however, that the regulations must operate to protect the game, and that the close season can be changed only when the needs of the county require it, or when to change it would be a protection to the game.

"With respect to deer: It is part of the history of the law as it now staods, which permits the killing of deer from September 1st to October 15th, that six weeks was intended by the legislature to be the extent of the open saason, and I am of the opinion that supervisors may change this period of six weeks so as to make it begin on the 1st of July, for example, and end August 15th, if such a regulation would be for the protection of deer in that county, or if the oeeds of the county make it advisable.

"I wish to call your attention, however, to the fact that supervisors can legislate nnly for their county, and that persoos will be protected hy the ordinances only as long as they are in that county.

"It is a misdemeanor for a person to have in his possession any deer at a time when it is unlawful to kill deer. The code makes it unlawful to kill deer except hetween September 1st and October 15th. Therefore, while the supervisors of Marin county, for example, might for that county change the open season for killing deer to the six weeks beginniog July 1st, yet if any sportsman from San Francisco should shoot deer in Marin county in July and take it into Sao Francisco, or any other county where the general law had not been changed by the supervisors, he would subject himself to prosecution.

"Again, the law—Section 636 of the penal code—forbids the selling or offering for sale of the hide or meat of deer. This law the supervisors cannot change. Therefore, deer meat and deer hides may not he sold nor offered for sale; nor may deer shot io one couoty, under an ordioance permitting it there, be carried into another county where the general State law is in force."

As the result of Attorney Deering's opinion it is believed that the Boards of Supervisors of Marin and other northern counties will immediately pass laws changing the open season on deer from October 1st to July 1st. It is also likely that the opening of the quail season will be changed from September 1st to October 1st.

The Fish Commission has already placed the opinion in the form of a bulletin, which as soon as possible will be issned from the State Printing Office for general dsitribution.

GEORGE SPENCE, the superintendent of the Puente coal mioes where 16 miners were killed recently, is being tried for their murder in a Mexican court at Piedras Negras.

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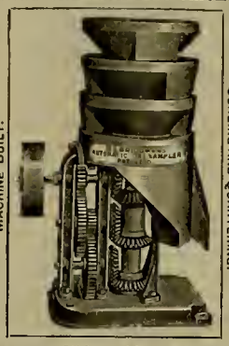

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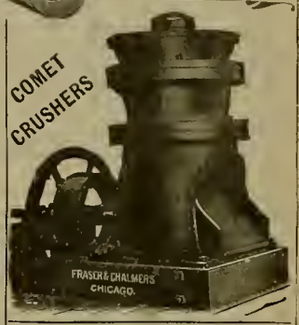

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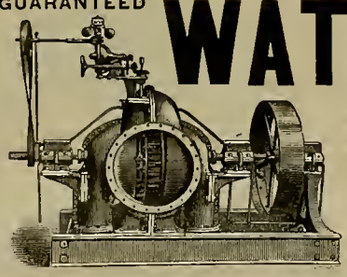

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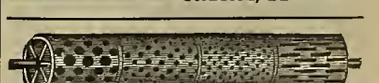

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Mechanical Progress.

The Duplex Process.

To Americans the most interesting paper contributed to the recent meeting of the Iron and Steel Institute, which was not read, owing to the absence of the author, says *Iron Age*, was that of Paul Kupelwieser of Witkowitz, Austria, on the manufacture of basic steel at those works. Witkowitz is, we believe, the only plant runniog on the duplex process, as it has been called, so that data relating to the results there obtained may prove very valuable to those who have pleaded for the combined acid Bessemer and basic open hearth for our own South. The method at the Austrian works is as follows:

Pig iron carrying too much phosphorus for the acid Bessemer process and too little for the basic Bessemer is taken direct from the blast furnace to a 4-ton Bessemer converter, acid lined. In it the metal is desiliconized, the operation of removing o 8 to 1.2 per cent silicon taking five to six minutes. The paper does not state what the manganese contents of the pig are, but the inference seems warranted that the manganese contents are quite considerable, since the Bessemer slag is used in the manufacture of ferromanganese.

The desiliconized metal is run into the open-hearth furnaces direct, but since the blast furoaces do not furnish iron enough, solid metal is added. For the year 1892 the three open-hearth furnaces melted 1649 charges, aggregating 30,297 tons, 56.16 per cent thereof, or 17,016 tons being desiliconized liquid metal, while 36 82 per cent, or 11,156 tons was cold pig, and 7.02 per cent was scrap Sundays, holidays and stoppages for repairs kept the open-hearth furnaces idle for 22 per cent, or nearly one-quarter, of the time. The product of ingots was 28,172 tons, or 93 per cent.

Concerning the life of the converters, Kupelwieser says that over 1000 charges are often made in the same vessel, and that more than 100 blows are made on the same bottom. No specific data are furnished on the life of the open-hearth furnaces.

The fuel consumption appears to be very low, 0.16 ton of coal being required for the producers, including the heating up of the furnaces and keeping them going during repairs. The consumption of coal for the blowing engines for heating converters and ladles figures up to 0.155 ton, making the total fuel account, 0.315 ton per ton of ingots. The quantity of lime addition used is 0.0795 ton per ton of ingots, while the amount of ore used is 0.063 ton.

Mr. Kupelwieser reports that the salaries and wages figure out 4 shillings 6 pence per ton, and that the cost of the dnplex process is lower by 10 shillings per ton than the straight basic open hearth. He asserts that if it had been possible to use a larger percentage of desiliconized fluid metal the cost would not have exceeded that of making steel from a low-phosphorus iron by the acid Bessemer process.

It is, of course, impossible to judge to what extent local conditions favor the duplex process at Witkowitz and whether similar economical results are obtainable elsewhere, notably io the South. But it is certain that the duplex process is technically feasible.

Metal Ties.

Railway corporations have been severely criticised for not abandoning the present form of wooden ties and replacing them by those made of metal. The various objections to the use of wood as a material have repeatedly been dwelt upon, but the critics have not given sufficient prominence to the fact that numerous experiments have been made in this direction during a number of years with very unsatisfactory practical results. It is possible and even probable that in the recent progress of inventive enterprise means will be discovered in some future time to obviate the serious difficulties which have arisen in a practical solution of this question. One objection of particular importance to the public is that the use of metal ties has been found to notably increase a jarring motion which would cause personal discomfort to passengers. In defense of the project for this substitution it has been urged that metal is in general use for this purpose in the tropical couotries of Asia, and that if railroads necessarily conducted upon cheaper methods can introduce this improvement the custom should be promptly adopted by our wealthier corporations. The fact that the substitution is effected in tropical latitudes may be in direct proof that some of the difficulties encountered in our climate are the result of varying conditions of temperature, and the remarkable fluctuations of heat and cold. But the primary reason for the custom is that the metal tie is presented to the white ant, with the classic advice to "gnaw that file," after proving that wood is powerless to resist the inroads of the ferocious armies of that indefatigable creature.—The Railway World.

Naval Construction and Maintenance.

The recent naval parade in New York, with the considerable stay of the various vessels that participated, says the *American Machinist*, was calculated to set people thinking about many things connected with the matter of modern navies. One of these is the length of time that is required for the construction of an efficient navy, one that shall amount to very much as navies go. For example, the United States has been rather vigorously at work for 10 or 12 years, and although able to make a very creditable display, still, of course, every American knows the great superiority of the naval force of European countries, which did not, we believe, through courtesy send their heavy fighting ships to participate in the parade. If ten years, during which so much has been done, finds this country so far back in the list, how will it stand in 20 or 30 years? Probably not at the head, but from the present temper of the people nearer the head than now, at the cost of a vast sum of money. But will the people remain in the present temper when the effect of this expenditure comes to be felt?

Again, naval vessels and guns soon become obsolete. It is not a question of wearing out, it is a question of being constantly superseded by the embodiment of modern ideas in naval constrnction, and this must constantly go on. The world is continuously engaged on the problem of makiog armor plates that cannot be pierced by modern projectiles, and in making guns against the projectiles from which no armor plate is invulnerable. It is the old problem slightly modified of the irresistible force and the immovable mass. This and the desire, if not the necessity, of keeping near the head calls for ceaseless work in naval construction and the guns the vessels carry, a work that is farther from completion as the years go by.

It is easy to see the result of this. It simply means that the people who work in the production of things that enable mankind to exist, or to live more comfortably, must work the harder and fare poorer.

The men who produce the materials for great ships and great guns, and who make them and man them, must be fed and clothed, and the men who produce food aod clothing must produce for these as well as for themselves. It means so much less of all that ought to be necessary because of the expenditure for what ought not to be oecessary. This is as the moralizer reasons, but he reasons without producing any effect. We may—must—admit the truth of this reasoning, but the great nations will keep on building warships just the same and maintaining great armies in idleness.

The people will have it the way it is. Nothing causes so much enthusiasm as a parade of the things and the means of causing death and destruction. This, so far as can be seen, will always be so, and so long as it is so nations will bankrupt themselves to keep abreast of other nations.

On the principle that a thing that is worth doing is worth doing well, Americans may feel pride in the display of American ships at the parade. To be sure, we did not display the largest nor the swiftest vessels, but then we are comparatively new at the business. Time and experience are required—time and experience and a good deal of money.

There is some satisfaction in believing that the skill and ability developed by a continual study of the problems involved in naval engineering and construction may be put to useful purposes in other directions; whether it is much or little there is doubtless something in this. Tools and machines and plans that are evolved for one purpose may be useful io other directions, and knowledge is something of wide application.

Since a navy must be maintained, every one will believe in having a good one. It exercises a more civilizing effect than a poor one, and if either are of any use it is more useful. If the naval parade brought home to us more forcibly that we lacked something in speed, let more speed be the lesson of the day, and so with other things that may have been more strongly forced upon those who especially understand or are supposed to understand such matters. We are in the way of making fighting machines just now, and ought to make good ones or go out of the business.

Scientific Progress.

Electricity and Cholera.

In view of the danger of a fresh outbreak of the fatal epidemic during the year, it is to be expected, says *Electricity*, that disinfectants not only will rise enormously in price, but that the demand will exceed the production, and it will be of interest to point out a simple method for the preparation of liquids containing chlorine, the active agent of the most efficient of disinfectants, chlorite of lime. By passing an electric current through an aqueous solution of soluble chloride, both the chloride and the water are decomposed. At the positive pole a very unstable chlorate is formed, which has very powerful oxidizing propertles, while at the negative pole another oxide is formed, capable of precipitating most organic substances.

We thus obtain by electrolysis a liquid which has the following properties: (1) It completely destroys the organic substances formed by putrefaction, as well as the noxious gases generated, such as sulphuretted hydrogen, ammonium sulphate, marsh gas, etc., and it also destroys all bacilli and other living ferments; (2) it precipitates albuminous substances of all kinds, and other suspicious ingredients contained in water; in other words, it clarifies the water. This method has already been used for technical purposes, such as bleaching paper-pulp and starch, and might be used with advantage for the bleaching of our linen, which receives such barbarous treatment on the part of the laundress. Why should this method not also be used for the disinfection of refuse, water-closets and contaminated water? It would certainly be of the greatest value in case of another outbreak of cholera, and especially in seaports, provided it were properly developed and rendered applicable on a large scale. The source of chlorine in a seaport is inexhaustible; it is simply sea-water. It does not signify in the least from whence the chlorine, the most powerful of all disinfecting agents, is derived; we have in sea-water an inexhaustible supply of the raw material, and in electrolysis an excellent method for the production of the active agent.

Scientific Education Invaluable.

Information concerning the positions that graduates of scientific schools obtain is readily gained by consulting the lists of graduates usually given, with their occupations, in catalogues of the best institutions. To generalize, a scientific school of good reputation feels, in granting a diploma to a student of marked ability, that it places to his credit a fund equivalent to not less than $10,000. This statement will doubtless be readily understood, if the instance be assumed of two young men of equal ability, one of whom graduates with honor from a scientific school at the age of 22 years, while the other engages in business with no assistance except his own energy and intelligence, which is true in a large majority of instances. Within four years after graduation the youog man from the scientific school will receive an annual compensation of at least $1500.

The young man in business will meet with more than the average of success if at the end of four years he receives $3 per day for services, unless he is located in New York or Chicago. Independently, then, of the great satisfaction which any educated person derives from his attainments and the greater eojoyment of the best interests of life, which can only be appreciated by a cultivated mind, the young man who adopts a profession within three years after graduation receives an annual income of six per cent on $10,000, the difference between the annual salary and that of the young man in business. At the end of ten years those who studied faithfully while at the scientific school are receiving from $4000 to $8000 or $10,000 a year from their salaries alone, while men of equal original abilities are doing well if they can earn over $3000 without imperilling capital of their own.—New York Ledger.

Contagiousness of Consumption.

Dr. J. G. Hopkins of Thomasville, Ga., read a paper on this subject which is reported in part In the *Medical Record*. The speaker said he had joined the growing army which placed tuberculosis in the category of contagious diseases, and his experience with this disease during 19 years of investigation in Thomasville—which place is a resort for consumptives—bore him out in his opinion, and made a willing subject of the great and erudite Koch. He does not doubt but that all men, women and children, at some time or times, receive into their air passages the tubercle bacilli, but fortunately the great majority possessed the power of repelling them and throwing them off—they did not find that soil, so to speak, which is adapted to their growth. Indians in a state of nativity seemed impervious to the germs of consumption, but were now dying by thousands on the reservations. The whites and the blacks in prisons all over the world labored under similar conditions. A report from the Illinois State Prison, at Joliet, says that there are 1400 convicts within the walls, and fully one-third of them have consumption in a light or bad form. Nearly all deaths of persons in the penitentiary have been caused by consumption.

Dr. Hopkios emphasized the danger that lurks in sleeping-cars, in carpets, bedding, clothing and in the walls of apartments occupied by consumptives, which have not been properly renovated and rendered harmless by antiseptic measures. Consumptives should be forced to provide for the destruction of sputa. Whenever situated so as not to expectorate directly into a germicide or the fire, they should use some means of conveying the sputa to the germicide or the flames. If handkerchiefs or cloths are used, they should not be sent to the laundry, as human happiness and life are jeopardized through the probability of inoculation through abrasions upon the hands. These bacilli should never be allowed to dry up and impregnate the air, as is now done through ignorance of possible result. Numerous experiments by leading medical authorities have proved beyond doubt that consumption is an inoculable disease, and so rapidly is the throng of converts growing that the speaker would not be surprised if even in his day resorts now soliciting the patronage of the consumptive will be quarantining against him.

NEW USE FOR PORTLAND CEMENT.—A German inventor of Mayence has discovered that Portland cement can be used as a substitute for rubber and asbestos preparations in the packing of steam joints. From extensive practical trials this cement packing is found to be quite as efficient as the others hitherto employed, and its cost is only one-tenth that of the others. The cement is made into a paste with water and spread into a layer of one-fifth inch to half-inch in thickness over the surface of the metal. The plate or cover to be fixed is then placed in position and the screws are simultaneously screwed down very slowly. After the layer has been compressed to about one-eighth inch in thickness the screwing is stopped and the cement allowed to harden for four hours. The screws are then turned further and the edges plastered again with cement. The joint is completed in eight hours after the making of the cement. From the above it would, however, appear that the sum saved by the use of a cheaper material, such as Portland cement, is out of all proportion to the time and trouble wasted in its use.—The Sanitary Plumber.

RECENTLY powdered metallic arsenic, which, in the process of powdering, had been moistened with water to prevent dusting, is recorded by E. Hirschsohn as capable of spontaneous comhustion. A quantity of powdered arsenic in a double paper bag had been received late in the evening, and set aside overnight in a basket containing other articles packed in straw and sawdust. The next morning, upon opening the store, the peculiar garlic-like odor attracted attention to the basket containing the powdered arsenic. An examination disclosed that the arsenic had agglutinated to a solid glowing mass; that the paper bags had been charred, and that a portion of the straw was scorched; a number of bottles in the basket had also burst, owing to the high heat, and upon the charred paper bag were sublimed some beautiful crystals of arsenious oxide.

THE chemical composition of the mantle in the new Auer incandescent lights has lately been discussed. The substance deposited on the cotton web consists of the oxides of metals of the cerium and zirconium groups, which exist in various minerals, for the most part in combination with silicic acid. The oxides are extracted from the minerals, and dissolved in nitric acid. This solution forms the bath in which the cotton web is dipped, and impregnates the latter so thoroughly that, on drying and burning, a finely meshed mantle of oxides remains.

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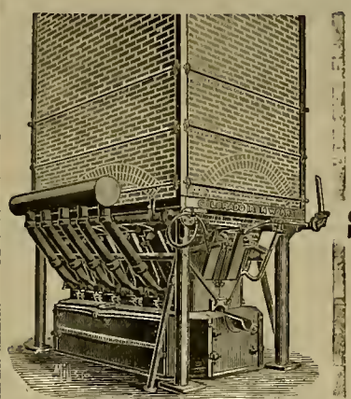

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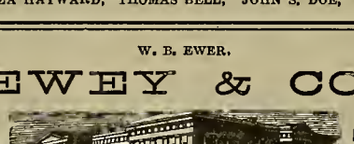

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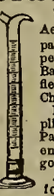

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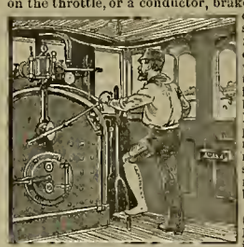

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Economy of Small Lighting Stations.

In an article on this subject. Lieut. James B. Cahoon, in the *Electrical World* says:

Let us take two small country stations and see wherein they differ. Take one in the State of New York, the other in the State of Vermont; the first one being run on the false economy, the latter one of the rejuvenated stations. These two stations are not many miles apart, and the services of an expert has been necessary at each within tbe past year. We will describe each in detail as far as possible, taking the New York one first. There were two lots offered for the station, one of whicb was near the center of the town and alongside the railroad track just at the end of one of the sidings. The price of this was about three times what they could get the other lot for, which was situated on the outskirts of the town, back about half a mile from the railroad track; hut as they got tbe lot cheaper they decided to take it. As they had saved quite a little in this way, it was determined to put up a fairly good building, and therefore a brick building was erected under the supervision of the vice-president of the company, who had had some experience in building. As the station was in an out-of-the-way place, only the cheaper grades of brick were employed in its construction, and a dry stone foundation used, which was pointed up on the inside. Although they would have to use some 400 or 500 h. p. in order to furnish the town and their customers with light, it was thought best to purchase only one engine, and therefore provision was only made for this, and a foundation some five feet in depth was made of rubble, with a top of three courses of brick. It was not deemed necessary to provide foundations for the dynamos, as none of them would be of any size, but an extra tbickness of two-inch planks was put down where the dynamos and jack shaft were to be situated. The boiler house was not separate from the station, but occupied one end. Cement foundations were provided for the boilers, and in front the earth was leveled off, forming an nrdinary dirt flonr. In order to get the light at the end windows, the boilers faced toward the outer wall. The engine was placed at the other side of the partition, back of the boiler. The ordinary high-pressure is used, exhausting into the atmosphere. No provision is made for heating the feed water, which is pumped in cold. The steam pipe leading from the steam drum makes four rightangled turns by the time it gets to the engine, the latter being of a well known make and capable of doing good service. The boilers were also good of their kind, and the electrical apparatus was first-class and was well installed at the station. The company decided, bowever, to let ont the contract for putting up its overhead lines to a local contractor, who made a fairly good job of it, doing his work as well as he knew how, but was compelled to use cbeap wire and cheap poles in his construction on account of the kind of wire and poles beiog specified in his contract. After all was finished, the son of one of the directors was put in as superintendent and business manager, with an electrician and chief engineer at a salary of $75 per month. His lamp trimmers, of which he had three for something under 200 lamps, did not receive very much pay because they did not have very much to do, as they only had between 55 and 60 lights apiece to trim.

As near as could be figured, subsequently, the boilers used about five pounds of ordinary soft coal per horse-power. There was no means of determining what the evaporation of the boilers was, i. e., how many pounds of water per pound of combustible. The first year quite extensive repairs had to be made on one of the boilers, owing to the crown sheet having burned through, due to the carelessness of one of the firemen in letting the water get too low; and the armature of an arc machine, whicb was designed for 50 lights, had to be twice replaced on account of overload, the superintendent boasting he could get 80 lights out of it, and usually did so, having at one time, he said, run as high as 85 lights. At the end of the first year the plant showed an apparent dividend of a little over five per cent on tbe investment, the next half year showed an increase in repairs which had to be made on the engine, the line kept giving trouble from frequent grounds, the insulation dropped off the wire, and so on. From that time on the plant has never shown a dividend of over 2¾ per cent.

(*Continued next week.*)

INTENSE HEATING BY ELECTRICITY.—Messrs. LaGrange and Hoho, of Belgium, whose process, for heating metals to a white heat by the passage of a strong current through an acidified solution, have suggested by their discovery the possibility of numerous applications of the result of their combined obserrations; and it is probable that in a very short while we will hear of new inventions based upon this heating process. It is not altogether an unexplored field, that of heating by electricity, but the simple manner in which tbis localizing of the heat is accomplished makes experimenting in this particular direction enticing and interesting. Come, inventors, get to work and let us see what you can bring forth?—Electrical Review.

The Trolley in the Road.

Under the above caption, the Philadelphia *Press* says:

The accidents which have occurred on the trolley road running between Media and Chester, in Delaware county, show that even on suburban roads a high rate of speed cannot be maintained without great danger. It is possible to run trolley cars from 15 to 20 miles an hour, possibly more, but such speed on a thoroughfare that is used for any other purpose must result in many accidents.

The occupation of country roads by trolley lines is likely to prove a great convenience in many respects. It will bring into closer relations the suburban commuoities, and open to settlement desirable parts of the country which have been inaccessible. The trolley is the best means of transit now available for that purpose, and it will accomplish a good deal until there is something better to take its place. But the trolley on the country road has its disadvantages. For considerable distances along some of the lines there is something of a rivalry with steam roads, and the disposition to compete with them has resulted in a dangerous rate of speed.

Experience has already proved the need of some strict regulation to it, that the danger of accidents may be reduced to a minimum. The public still has a right to the country roads as to the city streets, in spite of trolley lines. How much regulation is to be secured is not so plain. Neither township nor county authority to act upon such a matter is very well defined, there being no such legislative bodies as in cities and boroughs. The most forcible restraint in such a case will doubtless be the damage costs which are pretty certain to be assessed upoo the companies responsible for loss of life and destruction of property. With all this, however, the speed of the trolley car on public roads is very likely to command the attention of the next legislature. By that time there will have been enough experience with it to know just what is needed.

In cities and boroughs the local authorities can regulate the matter as promptly as they desire. Because we want rapid transit, and the trolley cars can be run 20 miles an hour, or more, it is not made practicable to run them at that rate. In fact, on the city streets—tbe streets of Philadelphia for instance—it will be impracticable to run tbe trolley cars much, if any, faster than horse cars have been run. No one can pretend that they are to furnish the rapid transit which this great city must have in the early future. We shall get larger cars and cleaner, because they will be new, and we hope to get more of them, but there can be but little faster traveling than at present.

Accidents on suburban rnads, due to higb speed, are much less likely than in the streets of a city. Bnt they do occur. There have been enough of them to prove the danger of trying to accomplish the speed of the steam roads on a surface used also for road vehicles and pedestrians. Grade crossings are bad enough. This is likely to prove worse.

Electric and Steam Railroads.

Electric railways were originally introduced as a substitute for horse cars in town and city traffic, and the promotors of the first lines saw little further occasion for them. But in an exceedingly short time their field of usefulness has broadened, until they are even now in many States a successful rival of steam railways for passenger traffic over lines of considerable length. Their relative cheapness of construction and ease of operation well adapt them for use in connecting centers of population and business with outlying towns and suburban districts, and this is being done all over the country. Brooklyn already has a system of electric railways stretching far out into Long Island, and tieing to it the number of small villages to the eastward. Newark, N. J., is in a similar manner reaching out for neighboring towns, and a line now building from Yonkers. on the Hudson, to New Rochelle, on Long Island sound, will connect the several considerable towns on its route and make more accessible the many desirable building sites in that part of Westchester county. Lexington, Ky., is also contemplating the construction of at least two electric lines which would connect it with Paris, the county seat of Bourbon county, 18 miles distant, and with Versailles, the seat of Woodford county, 15 miles away. The avowed object of the projectors is to induce the farmers to come to Lexington to make their purchases. In Pennsylvania a projected electric railway would parallel the main line of the Pennsylvania railway between Philadelphia and Lancaster, a distance of 70 miles; and those who are asking for the charter believe that the frequency of service and stops and the ease of getting at the cars will divert sufficient passenger traffic from the steam railway and encourage others to travel who use the existing line very little. A similar project in Illinois proposes a line right across the State from east to west, cutting present steam lines, and in this case serving as feeders to them. These few amoog the many electric railway enterprises already started In the United States show a rapidly-growing appreciation of the advantages of the system as a means of affording rapid and convenient transit to country districts, and in most cases they will serve as feeders to steam railways runniog through the sections thus improved, and tend to increase general traffic. The one thing yet wanting in these lines, as far as we know, is a service which includes the transportation of baggage and more valuable and compact parcels of goods. The suburban electric line that includes this service will well earn the gratitude of its patrons and make money besides, for a convenience of this kind will greatly advance the desirability of the region traversed as a place of resideoce, and thus increase the short-haul traffic, the most profitable traffic to the company.—Engineering News.

Useful Information.

Camels in Australia.

Although the camel proved unsatisfactory for use as a beast of burden in the mining regions of Nevada and Arizona, the animal is rapidly coming into favor and profitable use in mioing countries in other parts of the world. It seems probable to the mining iodustry that in south Africa the camel will take the place of the horse for most uses, as the camel is not injured by the insects which prove fatal to the horse and the bullock, nor is it attacked by the diseases that destroy other beasts of burden.

The Germans are already making great use of the camels in southwest Africa. They are found to be very valuable for making long journeys ioto the arid interior regions of the country, as they are able to travel a whole week without water or food. In Australia the camel is fast taking the place of bullocks for use in the barren interior regions. It is stated that there are already opened up and in regular work in Australia five lines of camel traffic, and that on these lines over 2000 camels are in daily use.

Camels are found to be so useful that the number employed will be increased as rapidly as possible. With bullock teams only about 10 miles a day can be made, but it is found that the camel will travel 84 miles in 18 hours, carrying a load of 300 pounds. In the ioterior of Australia are 1,000,000 square miles of almost unknown desert, and it is on the great inland plains that it is intended to utilize the camel trains, as by their use the various oases of civilization may be more directly connected than by the old bullock routes. On the arid plains and among the mud flats and brackish lakes the camel finds plenty of coarse grass and thorny shrubs on which to subsist. It is claimed that work can be found in Australia for 1,000,000 camels.—Public Ledger.

RUBBER TESTS.—Lieut. L. Vladomiroff, a Russian naval officer, has recently carried out a series of tests at the St. Petersburg Technical Institute with a view to establishing rules for estimatiog the quality of vulcanized india rubber. The followlng, in brief, are the conclusions arrived at, recourse being had to physical properties, since chemical analysis did not give any reliable result: 1. India rubber should not give the least sigo of superficial cracking when bent to an angle of 180 degrees after five hours of exposure in a closed air bath to a temperature of 125° C. The test pieces should be 2.4 inches thick. 2. Rubber that does not contain more than half its weight of metallic oxides should stretch to five times its length without breaking. 3. Rubber free from all foreign matter, except the sulphur used in vulcanizing it, should stretch to at least seven times its length without rupture. 4. The extension measured immediately after rupture should not exceed 12 per cent of the original length, with given dimensions. 5. Suppleness may be determined by measuring the percentage of asb formed in incineration. This may form the basis for deciding betweeo different grades of ruhber for certain purposes. 6. Vulcanized rubber should not harden under cold. These rules have been adopted for the Russian navy.

Ways to Injure Health.

Givlng way to fits of anger.

Leading a life of unfeeling, stupid laziness.

Contriving to keep up a continual worry about something or nothing.

Beginning in childhood on strong tea and coffee, and going from one step to another, through chewing and smoking tobacco, and drinking intoxicating liquors.

Allowing the power of gain to absorb our minds, so as to leave no time to attend to our health; following an uohealthful occupation because there is mooey in it.

Tempting the appetite with bitters and niceties when the stomach says no, and by forcing food into it when nature does not demand and even rejects it; gormandizing between meals.

Marrying in haste and getting an uncongenial companion, and living the remainder of life io mental dissatisfaction, cultivating jealousies and domestic broils, and always being in mental ferment.

Surfeiting on hot and very stimulating dinners; eating in a hurry, without half masticating the food, and eating heartily before going to bed, when the mind and body are exhausted by the toils of the day and the excitement of the evening.

Why a Cemetery is So Called.

Webster says a cemetery is "a place where the dead bodies of human beings are buried." But that is all he says, and there is not a five-year-old child in the land that could not tell as much without referring to his "uoabridged."

In tracing the derivation of the word, I find that the root is an old Jewish word, "caemeteria," meaning dormitories, or sleeping places. Later on, the form of expression was changed to "requietorium." In that section of "Camden's Remains" which has the heading of "Concerning British Epitaphs," I find the following (page 385, edition of 1650): "The place of burial was called by St. Paul 'semeoatoria,' in the respect of a sure hope of a resurrection." The Greeks call it "caemeterion," which means a sleeping place until the resurrection. The old Hebrew word for cemetery means "the house of the living," the idea being that death is only a protracted sleep that will terminate on the day when Gabriel blows his trumpet.—St. Louis Republic.

A Hammock Idea.

A young woman who lives in a small New York hotel, and has only one room, had a gift lately of a Guayaquil hammock—one of those great, gaily-colored webs that gives so delightfully. It seemed an odd present to a woman who hardly saw a veranda from one year's end to the other, but if she hasn't verandas she has ideas. She had hooks put in opposite corners of her room, and when she wants to deliciously lounge she swings the hammock from them. When it is not in use it is draped by means of a third hook across one entire side of the room, making, with its fringes and tassels, a brilliant wall decoration. Mary Hallock Foote says somewhere that an American back never learns to adjust itself to the luxury of a genuine South American or Mexican hammock. The owner of this one says she has learned more of the real theory of rest since she owned it than she ever knew before. "Since I learned to let go and siok," she said, "I have gained five pounds."

COST OF CARS.—A flat car costs about $380, a flat-bottom coal car $475, a gondola drop bottom $500, a double-hopper bottom coal car $525, a double-hopper bottom coke car $540, a box car $600, a stock car $550, a fruit car (ventilated) $700, and a refrigerator car $800. A four-wheeled caboose costs $550, and an eight-wheeled one $700. The prices given oo the above cars include power brakes and vertical-plane couplers. A 50-foot mail and baggage car $3500, a secood-class coach $4800. first-class coach $5500, while a first-class Pullman car costs $15,000.

THE number of sawmills in Washington is 456; Oregon 461; Idaho 114; Montana 70. Shingle mills in Washington, 212; Oregon 26; Idaho 8; Montana 5. Sash, door and planing mills in Washiogton, 56; Oregon 58; Idaho 10; Montana 16. Number of loggers in Washington, 17; Oregon 4; Idaho 10.

Water Purified by Iron.

The filthy water of the river Nethe is purified for use in Antwerp by being passed through revolving cylinders containing small pieces of iron. Fifteen pounds of magnetic iron will purify 1,000,000 gallons of water. The water thus treated is said to be completely free from germs, bacteria, and other objectionable matter. English and French chemists find that the contact with iron reduces the organic matter by from 45 to 85 per cent and albuminoid ammonia by from 50 to 90 per cent, and all free ammonia is removed. The process has been applied with success to the water of the Delaware river in Pennsylvania. It is simple and cheap. From all of which it may be inferred that the passage of drinking water through iron pipes does not injure it.—Baltimore American.

RAILROAD CROSS TIES.—There are in use in the United States not less than 550,000,000 railroad cross ties. The average life of a cross tie is put at five years on main lines. This would require for annual renewals alone, not counting new extensions, 101,000,000 new ties. The life of cross ties used on side tracks is much greater, but the average cannot exceed six or seven years, and at the lowest estimate 80,000,000 to 90,000,000 new ties will be required annually. This will require about 2,500,000,000 feet, board measure, of the best lumber.

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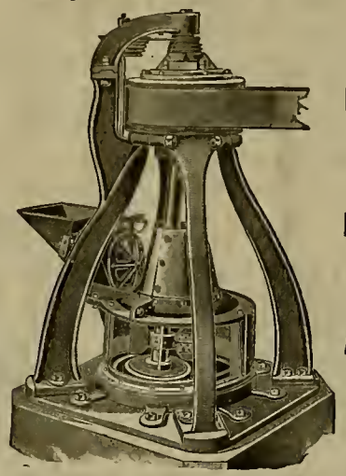

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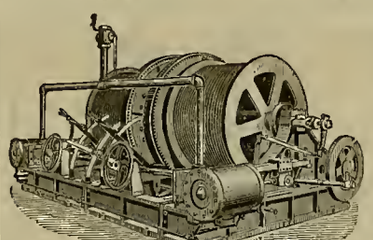

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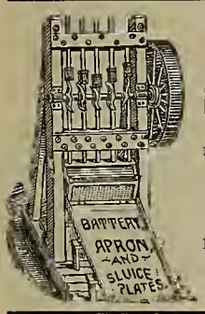

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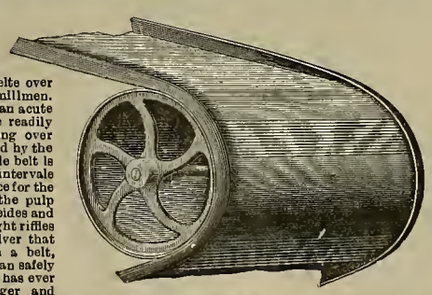

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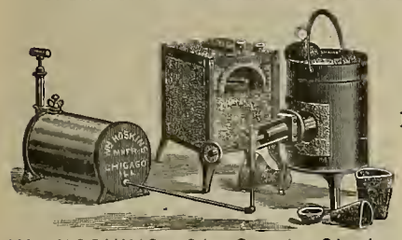

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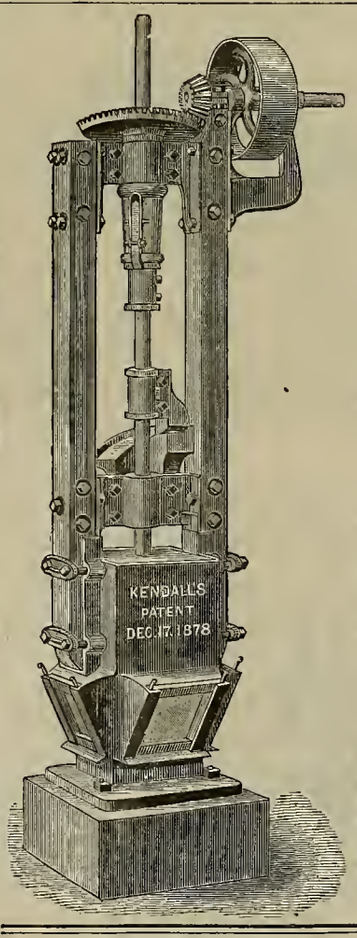

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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned

CALIFORNIA.

Amador.

FROM IRMAVILLE.—Cor. Amador *Dispatch*, June 24: Great excitement was created in this new town over the fact that the workmen in the mine belonging to Sheriff Gregory and Manager Shea, of the Irma, had struck the ledge two feet wide which prospects over $20 to the ton. At the Humboldt mine there is a respectful pile of ore on the dump which will be crushed next week. This is the third crushing from this mine in three months. At the Modoc mine a steel horse-power whim is being erected, and sinking will be commenced at once. This has in the past been a good paying property, and the owner has great hopes of its continuing to be so in the future. The Newcastle Mill and Mining Company has started to open out the Lone Willow mine under the superintendency of Charles Gracey. The Irma Mining Company has put in its new steam plant and set in place its new direct-acting Cornish pump, and the water has all been pumped out of the mine. It started up the mill on Tuesday, and the mill is running night and day. Thirty-eight men are now at work, and the force will be increased to fifty before the end of the present week. Milton Bearce is taking out good rock out of his tunnel next to the Irma property, and intends to have a crushing soon.

TO RESUME.—The New York mine, which has been lying idle for several months, is expected to resume active operations very soon on an extensive scale. There is a very large body of low-grade ore in this mine that can be worked to good advantage with the proper kind of machinery, and its successful working is only a matter of a short time, as the owners are all energetic men and are not afraid to put a few dollars into good machinery. It will, however, be necessary to sink about 100 feet deeper before work can be carried on to any great advantage.

Butte.

FORBESTOWN.—Oroville *Mercury*, June 26: W. M. James, superintendent of the famous Uncle Sam mine in Shasta county, who has for some months been looking at the mines in Forbestown has completed a bond of the quartz property of L. K. Reasoner, situated about one mile south of Forbestown. Mr. James represents one of the wealthiest English mining syndicates in the west, the same company owning and operating the Plumas-Eureka mine at the Sierra Buttes and the Uncle Sam mine in Shasta county. They control unlimited capital and will, under the bond, and at once commence development work on the lode. This mine is known to be rich, and the transaction undoubtedly means the erection of another great mill with all its advantages to eastern Butte.

Calaveras.

WORK RESUMED.—Calaveras *Chronicle*, June 24: Wm. Caldwell, Esq., owner of the Caldwell mine, located in Wet gulch, near Jesus Maria, arrived from San Francisco, Wednesday evening, prepared to commence operations at his mine. This property has not been worked since the heavy rains of last winter. Now that the weather is fine, Mr. Caldwell has determined to retimber the mine in a substantial manner, sink the shaft 100 feet deeper and run levels each way on the lead. Daniel Ross was employed as foreman and started for the mine Thursday morning. Under the able management of Mr. Ross, we expect soon to chronicle good news from the property. The former workings of this mine were very profitable to its owners. All the rock was hauled to mill some 12 miles and paid in the neighborhood of $40 per ton. The late workings have paid $16 per ton, as milled in a small prospecting mill, not more than one-half of the gold being saved. The Mauna Bros. own the extension of this mine and have a large body of good rock in sight. We are pleased to see Mr. Caldwell return, and, with his accustomed vim, are confident that the entire Jesus Maria district will be benefited, which of course means help for our town.

El Dorado.

MILL STARTED.—El Dorado *Republican*, June 27: The repairs on the mill at the Oro Fino mine were completed this week and the mill started, a head of water being got through from the Park canal. There are about 40 men now employed and work is being pushed in the shaft and drifts with air drills operated by two engines, the hoisting being done by a third. There are about 300 tons of ore on the dump ready for crushing. Grading is being done for the chlorination works. The same company is also cleaning out the shaft on the Fort Yuma mine, with the intention of prospecting it. H. G. Hulburd's five-stamp mill near Butte Flats is running on ore from the mine and will continue till the dump is exhausted. The vein is small and it is not likely that enough can be taken out to keep the mill running steadily. Power is furnished by 15 inches of water applied to a Knight wheel. Good results are being obtained from the run, it is said.

Humboldt.

PRESTON IRON MINE.—Blue Lake *Advocate*, June 24: The *Advocate* acknowledges a pleasant call Thursday from Mr. Frank Horton of the Pittsburg Iron Company, the corporation which has recently leased the Preston iron mine on Janes creek. There is a temporary cessation of work at the mine pending the arrival from the East of another member of the company, who is expected to reach Humboldt shortly after the Fourth. Mr. Horton informs us that he is down only about 20 feet so far, and that water is running in at such a rate as to preclude the possibility of a continuance without hoisting works, and that, as this machinery is expensive, it will not be put in until after the arrival of the gentleman expected from the East. We are informed that it is too soon yet to determine whether the vein is extensive enough to justify the erection of smelting works, but that when they reach a depth of 100 or 125 feet, they will be able to ascertain with reasonable accuracy how extensive it is. If, upon reaching that depth, the indications are what they believe they will be, a smelter is to be put up immediately. The ore (red hematite) is as rich, Mr. Horton assures us, as could be found anywhere else in the United States, and assays all the way from 60 to 80 odd per cent iron. The lease is for a period of 30 days, with privilege of 40 years, so that the company has all the time it wants.

Inyo.

A SUCCESSFUL PROCESS.—Inyo *Independent*, June 23: The leaching process of working ore has not been much practiced here, but Andrew Fyfe is making a success of it at the Montezuma mine. After the furnace at Elna was burned, about eight years ago, work at the Montezuma mine was stopped. During the time the mine had been worked much ore had been thrown in the dump, because it was fine, like sand or gravel. This is the ore that is now being leached. Mr. Fyfe experimented with the ore till he was satisfied money could be made by leaching it, and then he got a small plant and went to work. The principal part of the plant is tanks, and with three got at the brewery here, Mr. Fyfe has now enough to work 12 tons of ore each day. The ore carries from $8 to $30 gold, and from 18 to 20 ounces silver per ton. None of the lead is saved, and of this the ore carries 28 per cent. The ore at the dump is first screened, to get rid of all that is reduced to condition of dust, as this would pack too solid to permit the liquid to leach out the metal. From the size of wheat up to the size of beans is found to be the most favorable for leaching. The concentrates obtained by leaching are worth from $1600 to $1800 per ton. These will all be shipped to Salt Lake for reduction. Hyposulphide of soda and a very small portion of sulphate of copper are the chemicals used in leaching. Mr. Fyfe says these cost about 50 cents for each ton of ore worked. On the dump there is now at least 2000 tons of ore ready for working. In the mine is plenty of ore in sight, and when the dump shall be exhausted a crusher will be erected to reduce the ore taken from the mine to a proper condition for leaching. Several years ago Sheriff Gorman, who was then working the furnace at Swansea, smelted 300 tons of ore and got substantially the same returns of gold, silver and lead that Mr. Fyfe gets from it. Mr. Gorman still has the records kept when he smelted the ore, and these show returns as stated.

DULL.—Inyo *Index*, June 24: Times are dull—very dull—in this section, and there appears no early prospect of improvement. The home market which the silver mines afforded is nearly gone, as few mines are being worked, and even these on a reduced scale. With present transportation facilities, there are very few articles of production that can stand the expense of shipment.

Mono.

STARTED UP.—Bodie *Miner*, June 23: The Standard mill and mine started up on Sunday, having been closed down for a month and a half on account of lack of wood. The electric plant has been completed and will be in operation in a short time, but until electricity is used the mill will continue to be run by steam.

THE WARD.—A capitalist from Sacramento is expected to arrive here in a day or two to examine the Ward mine at Green creek. If the representations that have been made to him as to the value of the property are correct he is to purchase one of the claims for $16,000, and a stock company will be formed to take hold of it and work it a thorough and systematic manner. Thos. Ward, the owner, has about 80 tons of ore out now, and should the sale not be consummated he will run this through the five-stamp mill which he purchased in Bodie and moved out to Green creek last fall. A small run was made last fall which netted Ward about $46 per ton.

Nevada.

ANOTHER NORTH STAR DIVIDEND.—Grass Valley *Union*, June 24: Another dividend of 50 cents per share has been declared by the North Star Mining Company of this city, payable immediately. The amount payable aggregates $50,000, and the total amount of dividends so far paid since the reopening of the mine a few years ago amounts to $450,000. December of last year and March of this year dividends were declared, making $150,000 within six months. The mine is looking better than ever, and the company expects to be able to pay dividends regularly every quarter. Since Superintendent Abadie took possession five years ago, the mine has continued to improve. By economical management it is free from all debt and has paid to its stockholders the magnificent sum above mentioned. It is a noticeable fact that all the dividends declared have been under Superintendent Abadie's management, the first one being on July 11, 1888.

THE LUPIN STRIKE.—*Transcript*, June 23: The strike made at the Lupin gravel mine this week is regarded as the most important yet made on the Washington ridge, for the reason that it demonstrates beyond a doubt that the gravel channel extends up the ridge. The gravel found is of the same character as that found in the Harmony, West Harmony, Fountain Head, Cold Spring and Manzanita mines, although the gold is somewhat coarser. It is about ten miles from the Harmony mine to the Lupin. The channel evidently runs all the way, and although it may not all be rich, there is good reason to believe that paying gravel can be found nearly all the way. The gravel in the Lupin where the strike was make pays from $1.50 to $2 per pan. The owners of this mine are D. O. Williams, Hon. John Caldwell, F. T. Nilon, George Gehrig, all of this city, George Mainhart, E. W. Donnelly, Thomas Pearce, of Grass Valley, and another party whose name we do not now recall. From all indications it looks as though they had a big thing. We expect to hear of several new locations in that vicinity before a great while, and to note increased activity in work in all the drift mines already in operation along the ridge. Messrs. A. Isoard and Fred Zeitler, of this city, will visit that section in a day or two to see about buying or bonding one of the gravel locations there. If they do not succeed in this, they will probably make a location of their own.

LOOKING WELL.—*Transcript*, June 17: The mining outlook in Nevada township was never brighter than it is at the present time. More prospecting is being done than at any one time in years past, and in most cases the results obtained are very encouraging. With perhaps one exception the old developed mines are looking as well as ever and keep their regular crews of men at work. It is said that within a few days two mines in this vicinity will be sold to San Francisco capitalists and that the purchasers will at once have machinery put up for the systematic working of the properties. Both mines have been worked in a superficial manner for a number of years, but the owners have not been financially able to do any systematic work. It is believed that good mines can be developed there. The Reward mine, situated on the ridge above Deer creek and near the Rifle Grounds, is a new venture, but sufficient prospecting has been done at different points on the ledge to convince the owners that there is a good mine there and all that is necessary is to open it up. With this object in view a hoisting and pumping plant is being erected, capable of working to a great depth. The building is about completed and the machinery will soon be put in. A large two-compartment incline shaft is being sunk. R. C. Walrath and Jos. Thomas are the principal owners of the Reward. The old Sneath & Clay mine, situated on Gold Flat, was sold some time ago to a company of San Francisco capitalists, Lord Housman of this city retaining a good interest. The company expects to resume operations before a great while. It has been years since any effective work was done at this mine. Twenty-five years ago it was one of the richest and best-paying mines in the State. The two original owners, Sneath and Clay were made rich from it. Through mismanagement and misunderstanding the mine was closed down, and although the property has since been bonded to different parties, no work of any consequence has been done there from that day to this. It will take money to get the mine open again, but mining men who know the full history of the Sneath & Clay believe that there is plenty of rich rock there yet. Work will be pushed ahead on the Coan quartz mine, Indian Flat, which was lately bonded to R. R. Colgate, the well-known soap man of New York. A pumping and hoisting rig will be put up right away, and the shaft increased in depth. The Murchie mine was bonded some time ago and the bond expires soon. If the parties to whom it was bonded do not purchase, other parties stand ready to take it. This is believed to be a good piece of property by the miners who worked there when operations were suspended. The Federal Loan is one of the quartz mines that has come to the front during the past two years. A fine ledge of good quartz is being worked, and the mill is kept running night and day. Everything about the mine is done in a systematic, economical manner. The property is increasing in value all the time and is considered one of the most promising around here. There are several other mines in the Willow Valley district that are looking well and from which rich developments are expected. The Nevers west will be opened up some day. Rock which assayed as high as $700 per ton was taken from this ledge several years ago. The owners are without the capital necessary to properly develop the mine, but monied men will doubtless get hold of it before a great while and make a paying property of it. Lyons, Postelwaite and others have a fine prospect at Willow valley and have taken some very rich rock from their ledge. We learn that the old Hussey mine, which was worked some years ago, is soon to change hands and will be worked again. The Fountain Belle mine continues to look well, and good rock is being taken out right along. Only prospect work is being done. The Midnight mine, situated on Piety Hill, owned by Edwin Tilley and others, will be started up soon. Prospecting work is going on at the Charonnat mine, Canada Hill. A company of Colorado mining men are talking of buying this mine. The Mayflower, at Canada Hill, is holding its own. Fine rock is being taken out right along. John and William Kistle have resumed work on the Green Mountain ledge, near the Murchie mine. They have been prospecting this ledge off and on for some time. Prospectors are at work in all directions. When the sales of mines above referred to are made there will be a big increase in the number of miners employed hereabouts and still greater activity in all branches of business.

GOING TO APPLY FOR A LICENSE.—Grass Valley *Union*, June 23: The indications are that all the owners of the larger mines will take the necessary steps to procure licenses to resume hydraulicking, and it is believed in all cases licenses will be granted, for the reason that the law will be strictly complied with. Yesterday W. W. Waggoner, of Nevada City, went to Smartsville for the purpose of making a survey for a dam for the hydraulic miners in that section. The impression is very strong that the old mines which have been closed down for about 12 years will resume operations much sooner than the people generally had any idea they would. When these do start up there will be booming times in Nevada county, which is affected by the stoppage more than any other county in the State.

WILL START WORK.—Grass Valley *Telegraph*, June 27: The Board of Directors of the Lone Star Mining Company held a meeting to-day and decided to immediately send men to the claim to work. The tunnel will be thoroughly repaired and work will be pushed forward as rapidly as possible. The stock in the Lone Star is owned mostly by Grass Valley people. The mine is situated in the Gold Lake region in Sierra county.

Placer.

MAYFLOWER.—Colfax *Sentinel*, June 23: The Mayflower is running full blast. The Mammoth Consolidated Mining Company have their contract just about finished. It was let some time ago to Wm. Burns, to run 200 feet of tunnel through the gravel to tap the main channel and he is now within a few feet of finishing it.

YANKEE JIMS.—While at Yankee Jims the other day we saw a prospect taken from the "Ben Franklin" mine that reminded us of the fact that Yankee Jims district is not yet worked out. Out of a single pan of dirt Mr. Burke secured $70 in coarse gold, the sight of which was enough to make a newspaper man's mouth, also eyes, water, and to stir up within him all the covetousness of his soul. The prospect shows what yet lies hidden in some of our mining districts that are considered effete. Some day we will be chronicling the developments of larger operations in this old-time district.

Plumas.

ON THE NORTH FORK. — Plumas *National-Bulletin*, June 22: While the mining interest on the North Fork has not been very prosperous during the past few years, yet at the present time events point to a revival of that industry. The most notable development of late is in the King drift mine, owned by Fred Scott. It is situated near the lower end of Big Flat and is tapped by means of a 250-foot tunnel driven into the mountain about 250 feet above the bed of the North Fork. A big channel has been discovered and the gravel therefrom yields good returns. When we arrived at the mine Mr. Scott, Sr., was just finishing cleaning the product of four pans of gravel taken by him from the mine. The gold weighed $2.15. Mr. Scott is pushing development work on this property, and will soon employ quite a force of men. Immediately above the King is the Glenore, also owned by Fred Scott and others, the two mines covering one-half mile of channel up to the Cameron drift mine. Angus Cameron is continuing work in his gravel mine. His tunnel is in 780 feet, but no channel has yet been reached. He is now making an upraise about 400 feet from the mouth of the tunnel to prove whether he has passed the channel or not. In tunnels, upraises and drifts, Mr. Cameron alone, except a few months, has tunneled in this mine nearly 1500 feet, but he goes bravely ahead in search of the rich deposits of gravel which he is confident lie above or in front of the present works. Certainly it is there, for it is found in the King below and in the Glazier above. The Glazier, the Cameron, the Glenore and the King would make a big mining proposition for a company with means to develop it, controling four miles of channel proven to be rich at both ends. At Dutch Hill the Savercools are running a tunnel for development purposes. Duryea & Savercool have started work on the Kirkham claim. Geo. Scott and John Hickerson have good prospects in gravel on the eastern side of the North Fork opposite Marion Flat. James Firmstone is sinking an incline near Malvern Hill to develop a channel. His prospects appear to be good. Dick White is preparing to resume work in his mine, which has proven to be one of the best on the river. There are many other small mines operating in that section.

FOR THE SHENANDOAH.— *National-Bulletin*, June 24: The first shipment of freight over the Oroville road this season reached Spanish Ranch on Sunday. Two heavily loaded wagons, consisting of mining supplies and implements, in charge of George Maurer, for the Shenandoah's Company's mine in French Ravine, near Rich Bar, go forward to-day. In this connection it is worthy to note that Mr. Maurer, whose indomitable energy is well known, was the only teamster in the Foothills who would undertake the transportation of freight over the snow belt at this time. He has heretofore done all the company's freighting. The undertaking was one involving great skill, hard work, and withal much more perseverance than is ordinarily found in one man.

Captain J. W. Smith of Oakland, the general manager of the Shenandoah Q. M. Co., a man who has reached the age of 77 years and who is now performing what he terms his last missionary work in gold mining, also crossed the snow belt in a buckboard, alone, driving one horse, reaching Spanish Ranch Saturday, in good condition, in advance of the freight team.

NICE GOLD.—On Thursday, at Crescent, we saw the neat little sum of $600 in quartz gold obtained by Cook and Kuhlendorf from their placer mine between Soda creek and Curtis ravine, the result of work there during the season just closed. Evidently this gold came from a decomposed quartz vein in that vicinity.

FROM CROMBERG.—John M. Jackson was down from Cromberg Tuesday, on business. During the past several months, Mr. Jackson has been operating the Tefft mine. He has five men employed, and up to date has taken out several thousand dollars. The water season has been quite favorable and it will probably enable the lessee to ground-sluice most of the season. Mr. Jackson is a practical miner, having been engaged in that business since 1855.

THE ALTONA MINE.—Judge Emmons, of Greenville, has resumed work on the Altona mine operated by him last year. He is cleaning out and repairing the tunnel and will begin the extraction of ore. The ledge varies in width from three to sixteen feet, and the width increases with depth. This mine has a good reputation and last year it paid handsomely, and the prospects are that it will do the same in the future. It is located in the Cherokee mining district, northwest of the Green Mountain property. Last year the ore from it was hauled to the Acadia mill and crushed. Judge Emmons will soon have a patent to this valuable property.

FROM GIBSONVILLE.—F. M. Spencer arrived from Gibsonville Tuesday. He reports that section lively, and an increasing interest in the mines. The hotels are all full, it being difficult to secure a bed. Over 90 men are now working at Thistle Shaft. At the Union drift mine 25 hands are employed, and a large crew is at the Nevada. The Excelsior is understood to be yielding good pay. The tunnel at the Clayhank is being driven ahead.

OPENING MINES.—While in Prattville last week we met ex-Sheriff Rachford, of Modoc county. He was returning to the Eureka drift mine, owned by Rachford, Johnson & Emmerson. It is situated on Grizzly creek, seven miles south of Humbug valley. The company is running a tunnel to tap the mammoth channel, which can be traced to Cherokee, Butte county. Mr. Rachford is confident that a big mine exists there. Near by, on Soda creek, a small tributary to Mosquito creek, Mr. Rachford is prospecting good gravel and is getting some heavy gold. Some other Modoc parties are prospecting the Excelsior and Modoc, two claims situated on the channel above referred to. This country is liable to become an important mining camp of Plumas.

Shasta.

STRIKE.—Redding *Free Press*, June 24: A wonderful strike is reported on the south fork of Squaw creek, in which Jim Campbell and a man named Forbes are interested. Rumors of a big ledge containing free gold are rife.

A NEW MINING CAMP.—Redding *Free Press*, June 24: Mention was made two weeks ago of a sale of a mine an Pit river to a gentleman of Sacramento by Ezra Thomas for $4000. At the time of the sale we sought the particulars from A. D. Bowley, the purchaser, but that gentleman was somewhat chary of information, on the ground that he had not yet visited the prospect personally or consummated the deal. Wednesday afternoon we met Mr. Bowley, who had just returned from the pros-

pect, and he gave us the following information, which will ere long provoke some excitement and perhaps create a new mining camp in this county: The prospect is about five miles distant from the banks of Pit river, and about 20 miles in a straight line from Copper City, in a locality seldom visited by prospectors, and we should judge it to be on the same range as is Copper City and the old Afterthought mine at Furnaceville. Mr. Bowley says that the ledge is 50 feet wide and can be traced for two miles. He had to go on horseback, following a blind trail through almost impenetrable brush and over high mountains and across deep ravines. Across the ledge he blasted out specimens of quartz liberally sprinkled with free gold and sulphurets. The ore has a strong copper stain, and much of it is what is called "peacock" rock. Streaks of gold run through each specimen shown us, and Mr. Bowley says that anywhere pieces of rock bearing gold can be broken off the ledge. Since purchasing this prospect, Mr. Bowley, who is a real-estate dealer of Sacramento, has organized a company, and articles of incorporation will be filed in a few days. He says that there is no stock for sale, but that a company has been organized for working purposes only. If, as Mr. Bowley says, the ledge is extensive, there will be many other locations, and a second Copper City will be developed. In fact, it looks as if it were a similar deposit to that discovered at Copper City years ago; the ore probably lies in chimneys and bunches, and while some of it is base, other bunches will prove rich in free gold. Mr. Bowley will build a wagon road right away, and also a ferry across Pit river, and reduce the distance as much as possible. He leaves one man in charge, and before doing any thing further will pack into camp a load of provisions. Since the above was in type, we learn the additional facts from Mr. Bowley that the immediate ascent to the ledge is 1000 feet, almost perpendicular. The ledge itself is almost a perpendicular wall 24 feet high, and looks as if it had been laid bare by a slide. Mr. Bowley has located a water right and mill site, besides several claims, and in addition some seven or eight locations have been made by other parties. The mine was purchased of Thomas on the expert testimony of Captain Atkins, and the price paid was $10,000.

CYANIDE.—*Democrat*, June 28: Yesterday we noticed some large iron tanks being hauled out to the Hart mine. They are to be used in experimenting with the MacArthur-Forrest cyanide process. J. H. Stowell, the hardy old miner who owns valuable mines between Windy Camp and Iron Mountain, was in town Monday preparing to patent his group of five claims. During the past week there has been quite an exodus of prospectors to the new mining camp on Pootem creek, opposite the big bend on Pit river. According to the latest reports, some 40 odd claims have been located. Jewett Scranton is taking shipping ore from the Summit mine, in Sunny Hill district, that averages $700 a ton and over. All the high-grade ore from this mine is shipped to the Selby Smelting Works. This ore comes from a new chute lately discovered in the mine. Jim Sallee was in town last Saturday, having just returned from his mines on Salmon river. Jim says he is interested in a couple of good properties there, one of which pays a dividend of about $1000 a month, and the other is a new purchase which he is developing, and it is looking fine. He says the Salmon river country is a good country for the prospector. From Mr. C. N. Kingsbury of Igo, who was in town Monday, we learned that Mr. Edward Ballou is making a complete success with his experimental lixiviating and chlorinating plant in South Fork mining district. He works the gold ore of the camp up to 97 per cent and the silver ore up to 93 per cent. His mode is concentrating, lixiviating and chlorinating. He has gone through the experience of experimenting with refractory ores in that district and has achieved complete success. South Fork will boom yet.

Sierra.

THISTLE SHAFT.—*Mt. Messenger*, June 23: Seventy men are working at the Thistle shaft, Gibsonville, and, under the able management of C. B. Wingate, the mine is being worked with profitable results. The Pioneer Mining Co., at Grass Flat, intend to put up a new hoarding-house, and Superintendent Deisen expects very soon an electric plant from San Francisco, ordered by him on his recent business trip to the lower country.

Siskiyou.

RICH ROCK.—Redding *Free Press*, June 24: It is reported here that Jack Finley, superintendent for Captain C. J. Clark, who is running a mine on Salmon river, in Siskiyou county, has struck it exceedingly rich. He has no trouble in pounding out $500 per day in a hand mortar.

BONDED.—Yreka *Journal*, June 28: Cartright & Philips, of North Fork of Humbug, have bonded their mine to San Francisco parties for 30 days, and if everything is as satisfactory as prospects would indicate, they will make a sale for a good figure. San Francisco parties are investigating the Hegler mine, with a view of bonding. Much interest is now manifest in the mines of Humbug. Active work was begun on the Greenhorn Blue Gravel last Thursday. The new pump is performing its work in a highly satisfactory manner. They made considerable change and improvement in the hoisting works, so that they can progress without any interference. A full complement of men are at work day and night, and a large amount of gravel is being taken out. The supply of water for washing the dirt is falling off, and in order to meet this demand they are preparing to build a large tank to store up the water from the shaft, which will probably supply the deficiency. It is hoped that the Blue Gravel may have no further delays and that the work will continue prosperously. Mr. George Bowers, superintendent of the American Bar Co., at work in the Klamath river, called at the *Journal* office Monday, and showed us some fine, large specimens just taken out of the claim. He says that they are now at work with the most favorable prospects. The large water-wheel furnishes abundant power for operating the pumps, derricks, etc. The wheel is 18 feet in diameter and 54 feet long, and supplies several hundred horse power. They use two large centrifugal pumps. One takes water from the river and forces it through a pipe and sluices down the dirt in the claim, while the other carries the gravel and dirt into the sluice-boxes. The large boulders and rocks are removed with a derrick. The whole operation is carried on by water power, with the least amount of physical exertion of the men. They have about 30 men at work drifting and extending operations.

Trinity.

THE BIG DITCH.—Redding *Free Press*, June 24: Ed Jose, one of the owners of the Redding and Weaverville stage, informs us that the work will not commence on the big ditch intended to carry water to the Oregon Mountain gravel deposit until the latter part of next month. Three surveys are to be made first, one of which only has been accomplished.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—Virginia *Chronicle*, June 24: 1500 level—From the end of the southwest drift, 75 feet above the sill floor of this level, a winze has been started and sunk 15 feet in quartz formation. There is a narrow streak of ore in the winze averaging $22 per ton. 1650 level—Have continued making neccessary repairs to the drifts on the sill floor of this level and to extract some ore in working north from the crosscut run west from the northwest drift. The crosscut run east from the drift run south from the end of crosscut run east from a point 60 feet up in the upraise which was started from the drift run west from these north workings, 27 feet above the sill floor of this level, has been advanced 9 teet; total length 100 feet, continuing in porphyry and quartz showing some value. Have stopped work in this last crosscut and resumed work in the upraise from the point where the work was started. The upraise has been carried up 8 feet; total height, 68 feet. Have continued to extract some ore of average quality in working on the north and south sides of the drift run east (at a point 20 feet down) from the winze which was sunk from the crosscut run west from the main northwest drift. From the drift running south from this winze, at a point 52 feet down and 30 feet south, are extracting some ore of average quality. Have extracted during the week from all parts of the mine 278 cars of ore, about 272 tons. Have shipped to the Morgan mill 643 769-2000 tons, the average assay value of which (per car samples) was $29 86 per ton. The average assay value (per battery samples) of all the ore worked at that mill during the week (495 tons) was $28.19 per ton.

OPHIR—1565 level—The crosscut running east from the winze station on the sill floor of this level has been extended during the week 31 feet; total length 52 feet; continuing in a formation of porphyry, clay and quartz, which carries a low assay value. Have continued the work of making the necessary repairs in the shaft, being joint work with the Mexican company.

MEXICAN—On the 1565 level—The east crosscut from the north drift, at a point 409 feet in, has been extended 28 feet in a porphyry formation, showing clay separations. Have continued the work of making the necessary repairs in the shaft, being joint work with the Ophir company.

UTAH—340 level—The north drift from west crosscut No. 3, at a point 100 feet in from its mouth, has been extended 14 feet; total length 35 feet; face in quartzite, clay and porphyry formation of very low assay value.

SIERRA NEVADA—The intermediate tunnel on Cedar Hill has been advanced during the week 17 feet, making the total length 419 feet; the face is in porphyry. The joint Sierra Nevada and Union west drift, 900 level, has been advanced 19 feet, making the total distance west of the joint shaft 3286 feet; the face is in hard porphyry.

UNION SHAFT—The joint Sierra Nevada and Union west drift, 900 level has been advanced the past week 20 feet, making the total distance west of the shaft 3286 feet; the face is in hard porphyry.

ANDES — On 420 level. south drift from east crosscut No. 1 north, has been advanced 14 feet; total length 41 feet; formation in clay and quartz.

GREAT WESTERN.—The west crosscut from end of south lateral drift has been advanced the past week 10 feet; total distance, 47 feet. The face is in solid quartz of low grade, which is being saved. Indications are that the west wall of the last ledge will be tapped within a few feet farther. The crosscut will be continued west until the west or white ledge is tapped.

GOULD & CURRY—200 level—West crosscut No. 5, started in northwest drift, 432 feet from main west drift, has been advanced 9 feet, passing through hard porphyry; total length 520 feet. Sutro tunnel level—The joint east crosscut with Best & Belcher Co. has been advanced 18 feet during the week; total length 44 feet; face in soft porphyry and vein matter; also did some repairing to the main north drift during the past week.

BEST & BELCHER—200 level—Have resumed work in northwest drift, 230 feet from our south line; advanced same 15 feet; total length, 245 feet, passing through porphyry, clay and quartz. 900 level—The southwest drift started from west crosscut No. 3, has been advanced 18 feet; total length 160 feet; face in soft porphyry. Sutro tunnel level—The joint east crosscut with Gould & Curry Co. has been advanced 18 feet during the past week; total length, 44 feet; face of drift in soft porphyry and vein matter; also did some repairing to the main north drift during the past week.

HALE & NORCROSS.—On 900 level have advanced the south drift 24 feet; total length 24 feet; face in porphyry. 1100 level—Have finished retimbering the main station on this level. Started a new south drift and advanced the same 10 feet; face in porphyry and streaks of quartz. 1800 level—We are stripping the main south drift on this level. Main shaft—We continue retimbering above the 1200 level, and are repairing main incline where necessary.

POTOSI—The south drift, 35 feet west of the main shaft on the 850 level, is out 89 feet; face is in porphyry and seams of clay. In the south drift, 25 feet south of the east crosscut, 930 level, have started an upraise, which is now up 10 feet; the top shows three feet of quartz, some of which gives fair assays. The north drift, 200 feet east of the Potosi winze, 930 level, is out 151 feet; face shows from 1 to 2 feet of low-grade quartz. The raise from the north drift, 100 feet north of east crosscut, 930 level, is up 60 feet on the slope; the top shows five feet of quartz containing some porphyry. The stope 50 feet below the 930 level is yielding fair-grade ore. Extracted and sent to the Nevada mill the past week 603 tons and 1500 pounds of ore from the 550, 1000 and 1150 levels. Milled during the week 600 tons. On hand at mill 166 tons and 1750 pounds. Average battery assays, $22.28; average car-sample assays, $24 75; shipped to the U. S. Mint, Carson, 431 pounds crude bullion.

CHOLLAR—Are repairing the main shaft at a point 50 feet below the 850 level. The north drift from the east crosscut near the south line, 930 level, is out 82 feet; face is in porphyry and vein material.

WARD SHAFT.—Have completed repairs to shaft and are now removing all tools and materials from the 1800 level.

ALPHA.—Repairs to the Ward shaft are completed, and are now removing all tools and materials from the 1800 level.

EXCHEQUER.— Repairs to the Ward shaft are completed, and are now removing all tools and material from the 1800 level.

KENTUCK.—On the 1100 level we have extended the main south drift 10 feet; total, 75 feet; the face continues in low-grade ore. The upraise near the north line is up 46 feet; top in ore of milling value. The joint east crosscut on the Jacket north line is in 88 feet; face in quartz and porphyry. Have started a south drift from the joint crosscut in the ore found in said crosscut at a point 51 feet from the main south drift.

OCCIDENTAL—From the stopes and upraise on 650 level we have extracted about 40 tons of fair-grade ore. No. 3 crosscut from Zadig drift, Sutro tunnel level, has been extended 10 feet; face in quartz and porphyry.

NEW YORK. —The upraise from No. 3 west crosscut, 800 level, is up a distance of 46 feet on the slope; formation quartz.

Ruby Hill District.

GRIZZLEY ORE.—Salt Lake *Journal*, June 20: A carload of ore from the Grizzley mine, in Ruby Hill district, White Pine county, Nevada, is expected in the city by July 1st. This ore is rich in ruby and horn silver and bromides, and, according to McVicker, assays go 1049.96 ounces of silver to the ton. Mr. Ike Jennings, president and manager of the Grizzley Mining Company, informs the *Journal* that they have a four-foot body of this class of ore. The Grizzley is a great mine and will make Ruby Hill district more famous than ever, besides which it will make bonanza kings of its owners.

Ferguson District.

GOLD ORE.—Salt Lake *Journal*, June 24: There are two cars of rich gold ore in to-day from the Monitor mine, one of the properties of the April Fool Company, in Ferguson district, Nev. The Company expects to ship at least 100 tons during the present month.

Central District.

NEW GOLD DISCOVERY.—Carson *Appeal*, June 18: L. F. Dunn returned last night from a prospecting trip. After making several rich placer locations in the Humboldt range, he went over into Central district. There he discovered a gold ledge four feet in width, and as the miners say, it was "lousy with gold." It was found about 500 feet north of the northern boundary of the Blackbird and Fellows' claims, and lies between a slate and sienite formation. He says these other claims are spurs of his mine—that he has the mine of the district. Dunn and M. S. Bonnifield are the locators. In early days it was thought that our mines of value were silver mines and little attention was paid to gold. But from the valuable mines now being worked and new discoveries made in Central, Rebel Creek and Kennedy districts it seems we have most valuable gold veins. Besides hundreds of Chinamen and a great number of white men are taking out large quantities of gold from the many placer claims in this country. Dunn says the goldbugs cannot get the best of him as inside of 12 months he will have more gold than any of them.

White Horse District.

ONLY PROSPECTS SO FAR.—Wadsworth *Dispatch*, June 23: White Horse district and its mines have been partially prospected for 25 years. They are but "prospects" to-day; but, while we believe they are good ones, we bear in mind the setbacks and calamities which have befallen other mining camps which had prospects just as bright, and brighter, too, than the White Horse. It has taken Ferguson district a long time to recover from the boom caused by undue excitement at the beginning, and only to-day is that district recovering. The gag was put upon it by so-called mining experts. We have no desire to see White Horse paralyzed in that way, or a horde of idle miners brought into a mining camp where there is no work for them to do. As it is, there are simply good prospects. There are no developments to date to show the presence of large ore bodies, but the best mining talent on the Comstock theorize that large ore bodies will be found. It has been and is our belief that to say $10,000 ore is being found in White Horse, because a half-inch vein of that value was found, would mislead those whom we would seek to interest. Rich stringers bearing coarse gold are found along the whole lode. The only mine upon which much work has been done, and which shows a well-defined ledge, is the Jim Blaine, owned by Ed Gregory. He has a shaft 25 feet in depth and an 18-inch ledge with ore averaging $300 to the ton. This is certainly a fine prospect, but the extent of the ledge is not known. Wm. Johnson has a hole in the ground and thinks he has a ledge with rich ore, but extent not known. A trial lot of 400 pounds went $20 to the ton when milled at Reno, picked at haphazard. The Sunset Company has a shaft $25 feet deep. Quartz bearing coarse gold was found on the surface. Crosscutting will commence when, in the opinion of Superintendent Crosby, a sufficient depth has been reached. R. H. Cowles has struck a ledge by drifting, and says he is in good quartz. Dr. E. A. Jackman has a No. 1 prospect. There are rich croppings on other claims, but no developments have yet been made. We know, as does every other common-sense mortal, that if the claims in White Horse are good, the fact will be asserted soon. They will speak for themselves. In the meantime, we are fearful of intense excitement, and feel that no great good can come of it. The district is in good, careful hands. Ed Gregory, the primary prospector and most interested party, is a poor man with a great deal of good common sense, and he has handled the matter most successfully up to the present date, and has taken every step slowly and carefully. He is deserving of all he gets, and we trust the good angel who has guided his actions to this point will stay with him to the end. Part of the needed capital is interested, and we will soon know what there is in White Horse. There is room for capital, but the need for labor is at present limited. With excitement stayed we feel assured of the ultimate success of the mines, but excitement in this case is an enemy to be dreaded. Such excitement is the product of the tale that there is $10,000 ore in White Horse. If a prospector talking to a capitalist tells the latter he has $10,000 free-milling gold ore but feels too poor to work it, the moneyed man thinks the prospector is trying to "pull his leg," and negotiations cease. Simple, literal truth, and not extravagant language, is wanted. We have put money in White Horse, have faith in it, and believe it will get along without a boom.

BRITISH COLUMBIA.

CLAIMS REGISTERED.—*Golden Era*, June 24: Up to the present time 933 claims have been registered in this district. Notwithstanding this enormous number fresh strikes are constantly being made. Only two days ago two strangers found and located a most promising lead. The Wakefield claim, on Four-Mile creek, has been bonded for $15,000. The London Mercantile Association, which purchased through Mr. Chadbourn the group of claims known as the Read and Robertson, has completed a trail to the claims and started in to develop them. The Minnesota capitalists represented by W. D. Middaugh and Gen. Scott, have commenced work on their claims on Carpenter creek, and are breaking up the huge boulder of solid galena found on one of them.

DAKOTA.

THE DEADWOOD-TERRA.—Deadwood *Pioneer*, June 24: By the blowing out of a cylinder head and cracking of a cylinder at the Deadwood-Terra mill yesterday, about noon, the plant was crippled until repairs can be made, which will require some weeks. Engineer Woodcock turned off the steam as soon as possible, but the engine was rendered a complete wreck, so far as any present use of it is concerned. Just what caused the accident is hard to tell, but it is supposed that either a crosshead pin or a follower-bolt came out. It is thought that the mill will necessarily be shut down for about six weeks, as a new cylinder will be required from the Chicago works. This will throw about 300 men temporarily out of employment.

THE KEYSTONE.—There is an apparently well-authenticated rumor to the effect that the Keystone mill is to be increased from a 20 to a 60 stamp mill at once. It had been expected that at the annual meeting, to be held in July, such an increase would be decided on, but it is now stated that President Stone, who is a large stockholder, and who recently visited the plant, was so pleased with everything that he assumed the responsibility of ordering the mill enlarged. John Christensen will go over to the mill to-day to arrange for beginning the work. All this would seem to imply that, notwithstanding the negative reports, the Keystone is a booming success, and the stockholders are well satisfied.

TO BUILD A MILL.—Salt Lake *Mining Journal*, June 27: The Mercur Mining Company is considering the question of building a new mill at the mine. If the mill is built, the water to run it will be piped from the spring at the old mill, and Hal. D. Brown goes out next Monday to survey the pipe-line and mill-site. The new mill will have a capacity of from 200 to 400 tons of ore daily.

IDAHO.

EXTENSIVE PLACER MINING. — Salmon City *Recorder*, June 23: On last Thursday we visited the Lemhi Placer Co.'s diggings on Kirtley creek. The work, under the personal supervision of Mr. G. E. Yates, the manager, is being prosecuted in a thorough and systematic manner and with all modern appliances. Two of the giants were being used; the larger one, run with water from the Carmen creek ditch, was throwing a stream of 1150 miners' inches from a 6½-inch nozzle with a 375-foot pressure, and was tearing away the bank at a terrific rate. The smaller giant was run from the Kirtley creek ditch and was used merely to increase the volume of water. This, with the ground sluice, makes about 1800 inches of water altogether now in use. Some 65 men are on the pay-roll, the greater number of whom are employed in extending one branch of the flume some 75 or 80 feet up on the south side of the cut. When this is completed the third giant will be set to work, as the water supply will then be ample for work on a larger scale. The piping is continued day and night, the works being lighted by electricity with four large arc lights of 2000-candle power each. The ground prospects beyond the expectations of the management, and without doubt the company will make a nice clean-up as the result of the season's work.

MONTANA.

PLACER MINES.—Anaconda *Review*, June 22: The Rock Creek country is developing several rich sapphire diggings, stones from which are said to be more valuable than those found in the bars in Lewis and Clarke county. Encouraging reports are received from the Georgetown district of not only new discoveries but that properties idle for years will be and are being worked. New people are coming into the district every day and several important sales are on the tapis. Several reports have been received here from Princeton that the owners of the third extension to the Royal vein had struck ore in the main tunnel of the Mountain King, and that they had the same character of rock originally found in the Royal mine, from which over three fortunes have been taken. The Big Hole country is receiving an unusual amount of attention now on account of the report that new diggings had been opened near French Gulch, which ten years ago yielded $10 to $20 to the man. We can conscientiously say that this is going to be a prosperous year for mining operations in Montana, and Anaconda seems to be the center or tributary to the new fields of operation. There have been several important strikes in mining properties about Anaconda the past week. The first one that came to our notice was the one over in Lost Creek in the old Hidden Treasure property. They have found a small vein of exceedingly rich gold-bearing rock that needs no assaying

to say how valuable it is. It will only take a ton or two to satisfy our worldly desires. An old-time miner informed the *Review* man the other day that there were more gold prospects in the Georgetown district that would pay capitalists to take hold of than in any other section of Mootana. He said that it would take a little money to develop them, but that there was enough in sight to pay for all development work.

UTAH.

CAMP CROSSCUTS.—Park *Record*, June 24: Ore-hauling continues quite active in spite of the low price of silver and lead. Dave Condon has resumed operations on the Creole, the surface water having ceased to give any trouble. He is drifting on the vein. On the 21st the Ontario mill shipped 26 bars of bullion containing 16,325.29 fine ounces of silver. This is the first shipment since the mill was repaired. The grade for the new leaching plant is rapidly nearing completion, and the work of laying the foundations will soon be commenced. Bartley McDonough and Hugh Kilkenny have received a United States patent for the Golden Head and Salt Hill Consolidated mining claim, lot No. 151, located in Snake Creek mining district. The piping for the Alliance tunnel has all been taken to the mine, and is now being placed in position. It is thought the tuonel will be turned over to the Crescent Company some time next month. The Kentucky leasers are cleaning out the old shaft and re-timbering it. As soon as the bottom is reached, the vein that was cut therein will be followed. Some very fine ore was found io the vein, but there was only a little of it. The following lots of ore were received at and forwarded from the Mackintosh sampler during the present week: Anchor, 681,600 pounds; Silver King, 6co,500; Daly, 301,610; Daly West, 301,570, making a total of 1,885,280 pounds.

CRESCENT.—Salt Lake *Journal*, June 27: Thos. Carter, a large Crescent stockholder, returned Saturday from a visit to the mine at Park City. He informs the *Journal* that the mine is in an excellent shape, and that the average daily output is 130 tons of first and second class ore. A large amount of ore is being stored at the concentrator so that a winter's run can be made if necessary. In another month the winter's coal for the mine will be taken up, and preparations will he made so that mine and mill can be kept in constant operation if the metal market will justify. C. McCarty, one of the operators of the Lone Pine, in American Fork canyon, was in the city Saturday. Some good ore has been recently encountered in the Loue Pine, and it promises to he a heavy producer. Mr. McCarty says that, although that district has been laboring under a bad case of black eye for some time, still it is bound to come to the front again, hecause they have the ore, rich and unlimited. Frank T. Hiatt has leased the Iron Duke mine for one year at 10 per cent royalty to E. C. Small and F. X. Hoy. The Iron Duke is located near Silver City, Tintic, and is a property of much promise. Tom Lewis and associates, who have stuck so pluckily to the Cleveland, at Mammoth, are about to receive their reward. Last week a fine body of ore was encountered, assaying between $200 and $250 per ton.

Market Reports.

The Markets.

SAN FRANCISCO, June 29, 1893.

During the week past the price of silver has taken an unprecedented drop, the direct cause being the announcement that the Indian Government had passed an Act closing their mints to the free coinage of silver. It is declared to be the intention of the Indian Government to introduce and maintain a gold standard, but that gold in the meantime will not be made the sole legal tender. Inasmuch as India is one of the heaviest buyers of silver, its unexpected action has had the effect of producing a temporary paralysis of the silver market. Since Monday the price has rapidly declined, until to-day the New York quotation was 62 cents, a drop in four days of nearly 20 cents per ounce. In London, the falling off has been nearly as notable, the quotation being 37⅛ pence Saturday and 34 pence yesterday. We have at this writing received no advices of to-day's London quotation.

The direct result of the action of India has been to renew the discussion of the silver question; to shut down a large number of mines and smelters; to stop silver purchases; to renew the probability that Congress will be called early in September to deal with the money question; and to strengthen the hands of the miners in their efforts to resume hydraulic mining in California.

The stoppage of silver coinage on private account in India, acting under direction of the British Government it is admitted, will have momentous consequences. For instance, the effect on Indian wheat competition with American wheat and on this country's trade with the East Indies and with South America, is a subject that is involved in uncertainty, and not least of the consequences which are shrouded in doubt is the possible result of England's action on her own Eastern dependencies, and the reaction which will be felt everywhere on international trade. Conservative men are loth to commit themselves to positive opinions upon the different aspects of the situation.

The confusion into which the silver market has been thrown was indicated when dealing in silver hullion certificates began Tuesday at the New York Stock Exchange. These certificates are issued by the Mercantile Safe Deposit Company upon bullion deposited with it. The company now has only 210,742 ounces. There has been no extensive speculation in these certificates since the big "bull" movement which attended the progress of the legislation that took form in the so-called Sherman law of 1890. Tuesday the market for certificates opened in a complete state of demoralization.

The first bids were 74 cents an ounce, but no offers were made below 78 cents, the Monday-night price. As no sales were possible at higher figures, holders began to reduce their offers, but would-be buyers more rapidly lowered their bids. By the close the difference between bids and offers, which had started at four cents an ounce, had widened to 6 cents, offers being made at 76 cents and the best bid being 70 cents. There was not a single transaction in consequence of the wide disparity between the views of buyers and holders.

The commercial market for bar silver was practically at a standstill, but 73 cents more was the nominal price. In London the price of bar silver fell to 35d per ounce, following the decline of 1⅛d on Monday.

Opinions differ as to the immediate cause of the silver market depreciating. The effect of England's action is admitted, but some of the dealers contend that the full effect of the shock has been felt for the present.

Secretary Carlisle, in response to a request to express his views on the financial situation as affected by the action of India on silver, politely declined, saying that under the circumstances he had nothing to say for publication and did not care to indulge in speculation as to the future.

Two hours were consumed by the Cabinet Tuesday discussing the new phase of the silver question, while other matters were demanding attention.

Although the discussion, it is said, took a wide range, it was necessarily brought back to the ooe important and unmanageble point that the executive had no power in the premises, Congress alone being able to deal with measures of relief. It was plain to the Cabinet that the monthly purchase of silver must be continued or Congress must be convened in soecial session immediately. As the President has decided to call Congress together in the early part of September to deal with the financial situation, and has manifested no intention of changing his purpose, the project of an earlier session of Congress, it is understood, was dropped.

A Monetary Revolution.

A. J. Warner, of Ohio, president of the Bimetallic League, says: "The stoppage of the coinage of silver in India has inaugurated a new mooetary revolution. It is a movement deep-seated, and it will be far-reaching in its consequences. The closing of the mints of Bombay and Calcutta is part of a gigantic coospiracy to seize upon the present opportunity to finally and forever adopt the single gold standard and to extend it all over the world. The immediate consequence will be that silver will fall and gold will increase in value faster than ever before. Prices will fall everywwhere as gold rises, and every advantage will inure to creditors and creditor nations. England has set out to subdue the world, not with arms but with gold.

"What is there left to do but for the western continent, under the lead of the United States, to unite and act independently and establish a financial system founded upon equity and calculated to secure stability in value, and one which will keep an even halance between debtor and creditor—not one calculated to rob with impunity the debtor for the benefit of the creditor."

A national convention of the American Bimetallic League has already been decided upon for the latter part of August at St. Louis or Chicago.

Gold from England.

Owing to the low rates of sterling exchange the first importation of gold for some time has left Southampton for New York. The amount is $500,000. It is reported that $1,000 000 more is ordered.

San Francisco Metal and Coal Market.

ANTIMONY.			STEEL.		
Per lb	—	@ 14	English, lb	—	@ 18
BORAX.			Chaoton tool	—	@ 8½
Refined, in car lots	—	@ 7½	S'l't Diam'd tool	8½	@ 15
Powdered, do	—	@ 7½	Pick & Hammer	6½	@ 10
Concentrat'd, do	—	@ 6¾	Machinery	4	@ 5
All grades jobbing at advance.			Toe Calk	—	@ 4½
COPPER.			TINPLATE.		
Bolt	22	@ —	B. V. steel grade		
Sheathing	22	@ —	14x20, spot	—	@ 5 87½
Ingot, jobbing	—	@ 14½	Charcoal, 14x20	—	@ 5 87½
Do, wholesale	—	@ 13½	Do roofing, 14x20	—	@ 5 87½
Fire Box Sheets	22	@ 24	Do, do, 20x28	—	@11 75
IRON.			PIG TIN.		
Bar, base	—	@ 3	Spot ₩ lb	—	@ 24
Norway, base	—	@ 4½			
PIG IRON.			COAL.		
	Spot.		SPOT FROM YARD—PER TON.		
Eglinton ₩ ton	20 00	@— —	Wellington	8	00
Glengarnock	21 00	@— —	Greta	7	50
Am. Soft, No. 1	22 00	@— —	Nanaimo	6	50
Shotts No 1	22 00	@— —	Cilman	6	00
Puget Sound	20 00	@— —	Seattle	6	50
Clay Lane White	21 00	@— —	Coos Bay	5	50
Langloan	22 50	@— —	Camel	8	50
Gartsherrie	22 50	@— —	Egg hard	12	00
Barrow	22 50	@— —	Wallsend	7	25
Cargoflect	22 00	@— —	Scotch Splint	8	00
CHROME IRON ORE.			Brymho	7	50
Per ton	10 00	@— —	West Hartley	8	00
LEAD.			TO LOAD—PER TON.		
Pig	—	@ 4½	Australian	6 37½	— —
Bar	—	@ 5½	Liverpool Steam	6 50	@— —
Sheet	—	@ 7½	Scotch Splint	00	@— —
Pipe	—	@ 5½	Cardiff	5	@— —
SHOT.			Lehigh Lump	11 00	@— —
Drop, sizes *smaller* than B, ₩ bag of 25 lbs	81 80		Cumberland	12 00	@— —
Do do, B and *larger* sizes ₩ bag of 25 lbs	2 00		Egg, hard	10 00	@— —
Buck, Balls and Chilled do, ₩ bag of 25 lbs	2 00		West Hartley	7 50	@— —
QUICKSILVER.			COKE.		
Home trade, per flask	42 50	@43 00	English, to load	39 50	@10 00
			Do, spot, to hulk	—	@10 00
			Do, in sacks	—	@11 50
			Cumberland	9 50	@— —

NEW YORK, June 29.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.	Copper.	Lead.	Tin.
Thursday	38	81½	.....	.....	.....
Friday	38	81½	10 60	3 57½	20 10
Saturday	37½	80¾	10 60	3 57½	20 10
Mooday	36	77	10 65	3 52½	19 80
Tuesday	35	73	10 60	3 47½	19 55
Wednesday	34	69	10 50	3 40	19 75

Mining Share Market.

The decline in silver started stocks downward as might have been expected, though the market was rather active on Monday. Since then, however, it has been dull and weak. Favorable news from the mines cuts little figure. The large proportion of gold in Comstock ores compared with the general run of silver mines is a good thing, but silver mining is "in the dumps" just now and will be until Congress takes some definite steps.

The San Francisco and the Pacific Boards adjourn from Friday noon over to Wednesday morning.

The West Consolidated and Virginia and California Mining Company, by a representation of 92,008 shares, has elected the following directors and officers: M. W. Fox, president; George P. Thurston, vice-president, and W. T. Baggett, A. D. Carvill and R. U. Collins, directors. P. H. Andross was re-elected secretary.

The North Belle Isle Mining Company has re-elected the old management with E. Scott as president, J. W. Pew secretary and R. C. Catlin superintendent. The company has a debt of $7916.22.

The Mayflower Gravel Mining Company has declared a special dividend, of 10 cents per share, payable June 30th.

The North Star Mining Company of Grass Valley has declared a dividend of 50 cents per share, aggregating $50,ono. This mine has paid $420,000 in dividends since the re-opening of the mine a few years ago.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, June 29, 1893.

9:30 A. M. SESSION.

550 Andes	20c	100 Mexican	70c
700 Belcher	50	50	75c
100 Best & Belcher	50c	100 Ophir	1.25
100	65c	300	1.10
900 Bullion	3 c	350	1.15
300 Challenge	10c	200 Overman	20c
100 Chollar	45c	1050 Belcher	105c
225	50c	100	1.05
400 Con. Cal. & Va	1.45	400 Savage	40c
150	1.40	100 Seg Belcher	10c
400 Crown Point	30c	600 Sierra Nevada	60c
400 Could & Curry	45c	800 Union	55c
50 Hale & Norcross	35c	300 Yellow Jacket	1.05
50	30c	1700	1.00
700 Kentuck	15c		

2:35 P. M. SESSION.

400 Ophir	1.05	100 Crown Point	30c
400	1.10	100	25c
10	1.00	550 Yellow Jacket	95c
420 Mexican	65c	550 Keotuck	15c
20	60c	1050 Belcher	50c
300 Could & Curry	45c	100 Confidence	50c
100	40c	500 Con New York	10c
250 Best & Belcher	55c	100 Andes	20c
25	50c	100	15c
150 Con. Cal. & Va	1.45	50 Union	50c
100	1.40	100	55c
270 Savage	35c	200 Overman	15c
400 Chollar	45c	200 Bullion	30c
350 Potosi	85c	1050	25c
500	90c	620 Sierra Nevada	60c
240 H & N	30c		

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JUNE 20, 1893.

499,960.—ROTATING INDEX—R. N. Brooks, S. F.

499,719.—CANE STOOL—O. P. Dabney, Salem, Or.

499 915.—SEPARATOR—J. M. Finch, Marysville, Cal.

499 985.—HOSE-BAND—I. S. Goldman, Los Angeles, Cal.

499,906.—PLANT RECEPTICLE—C. Hoffman, Rosshurg, Or.

499,835.—TRUNK—F. S. Jerome, S. F.

500,005.—ROTARY FAN—J. H. Jones, S. F.

499,789.—SAW SET—C. M. Kardell, Marshfield, Or.

501,015.—COIN CONTROLLED MACHINE—J. A. Lighthipe, S. F.

499,746.—FARE REGISTER—C. L. Logan, Los Angeles, Cal.

500,029.—HOSE STRAP FASTENER.—B. W. McKenzie, San Diego, Cal.

499,887.—LADDER—Messer & Cox, Riverside Cal.

500,074.—CAR COUPLING—R. Nash, Tacoma, Wash.

499,848.—SECONDARY BATTERY—F. C. Norton, Oroville, Cal.

499,851.—SEAT AND DESK—G. W. Peck, Tacoma, Wash.

499,931.—ADVERTISING CLOCK—L. Peterson, San Rafael, Cal.

499,934.—ROPE LEADER FOR DRUMS—N. H. Pine, Eureka, Cal.

499,853.—REVERSIBLE PLOW—A. Pirch, Los Angeles, Cal.

499 938.—ANIMAL SHEARS—A. D. Reynolds, S. F.

499 939. TELEMETER—J. F. Santillana, S. F.

499,949.—CAN HEADER—M. A Wheaton, S F.

499,815.—FILLER—A Williams, Seattle Wash.

500,691.—BED-CHAIR—J. C. Wood, Los Angeles, Cal.

499,902.—BED-COUCH—J C. Wood, Los Angeles, Cal.

The following brief list by telegraph, for June 27, will appear more complete on receipt of mail advices:

Oregon—Clarence A. Burhank, Portland, houqnet holder.

Montana — Earl P. Wetmore, Helena, electric heater.

Nevada—Albert W. Lacey, Gold Hill, cable protector.

Washington—John T. Bibb, Tacoma, current motor; Joseph P. Brickley, Port Angeles, platform for wood-choppers; Albert Johnson and F. Syornd, Shelton, rowing narrow; John T. Lucas, Centerville, gang or cultivator plow.

California—Daniel Behmer, Santa Rosa, pruning implement; Friend J. Bringham, Oroville, billet-loop; Andrew J. Culbertson, San Andreas, train-table; William A. Dohle, San Francisco, apparatus for reducing bituminous substances; Hugo Gallinowsky, San Francisco, artificial stone; John H. Griswold, Oakland, line-holder and guide; Joseph J. Hall, Willows, grate; Alfonzo Haskins, San Francisco, asphalt distegrating holler; Cornella F. Hathaway, San Francisco, shoe-lace fastener; Arthur T. Snell, West Satlcoy, and W. R. H. Weldon, Ventura, harness; William S. O'Srien, San Francisco, design.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CARD CATALOGUE AND INDEX.—Alexander J. Rndolph, S. F. No. 499,441. Dated June 13, 1893. This improvement in indexes and files consists of a series of cards with a means for holding index slips upon them, a box within which the cards are sustained, a pecnliar device for snpporting the cards in position to be readily examined, and movable indicators whereby the proper position of each card of a series is at once determined and any displacement of any card is detected.

BOOK INDEX AND FILE.—A. J. Rndolph, S. F. No. 499,442. Dated June 13, 1893. The invention relates to certain improvements for compiling and arranging catalogne indexes or files. It consists of a series of slip-holders to contain index or other slips, said holders being hinged together at one edge and capable of indefinite multiplication or snbdivision, the hinges being easily disengaged for that purpose. The object of the invention is to provide what the inventor calls an elastic book index, in which each entry is movable so that any number of entries may be inserted before or after it, and every entry, whether new or old, is always in its own proper place; and furtber, in the ability to insert any number of slip-holders at any point with relation to those already in the book, whereby the hook may be indefinitely enlarged, or it may he snbdivided at any time to form new volumes if it becomes too bulky.

SEPARATOR. — John M. Finch, Marysville. No. 499,915. Dated June 20, 1893. The invention relates to that class of machines for separating materials composed of particles of different specific gravities, in which a current of air is directed upon the falling material, said machines being known as air or gravity separators or purifiers, and particnlarly designed for separating or purifying middlings in flour-mills. The invention consists in a rotating cage to which the material is fed, the periphery of said cage heing so constrncted as to retain and constantly raise and drop the material, and of an open character to freely admit the passage of a current of air through it, and snitable means for creating and directing a current of air through the open periphery of said cage and against the constantly falling material, whereby the latter is repeatedly snbjected to said current.

ANVERTISING CLOCK.—Lewis Peterson, San Rafael, assignor to Western Clock Advertising Co., of San Francisco. No. 499,931. Dated June 20, 1893. The invention relates to that class of advertising devices in which a series of advertising placards is periodically driven to exhibit snccessive placards, by means of a clock operating through snitable intermediate mechanisms. The object of the invention is to provide a simple, effective and attractive device of this kind, and the patent covers certain novel combinations and arrangements of parts. As each placard is dropped by the mechanism a gong is struck which attracts attention to the exhibition of the placard. The time during which the placard is exhibited can be properly determined by the movement given to a certain cam wheel.

EB WILLIAMS,

ATTORNEY - AT - LAW,

NOGALES, ARIZONA.

Will give attention to the collection of claims and settlement of business in any part of Mexico.

Reference—L. C. Hughes, Guerno; Roy & Titcomb, Nogales; International Bank, Nogales.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY AND LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T AND SALE.	SECRETARY.
Alpha Cons M Co, Nevada	01	10c	May 10,	June 14, July 5	C E Elliott, 309 Mootgomery
Alta M Co, Nev	43	15c	April 26,	June 21, July 12	L Osborn, 309 Montgomery
Best & Belcher M Co, Nevada	54	25c	June 6,	July 14, August 4	L Osborn, 309 Montgomery
Cons New York M Co, Nevada	10	10c	May 12,	June 15, July 10	C E Elliott, 309 Montgomery
Cons St Cothard M Co, California	8	5c	May 11,	June 15, July 6	T Wetzell, 320 Sansome
Crocker M Co, Arizona	14	5c	June 8,	July 13, August 3	A Waterman, 309 Montgomery
Crown Point M Co, Nevada	61	25c	June 12,	July 18, August 8	J Newlands, Mills B'l'd'g
Derbec Blue Gravel M Co, California	11	5c	May 31,	July 5, July 27	T Welzel, 320 Sansome
Eclipse M Co, California	4	2c	May 11,	June 12, July 3	O Tum Suden, 216 Bush
El Leopoldo M Co, Mexico	3	5c	May 25,	July 1, July 26	Jabez Howes, 214 Pine
Exchequer M Co, Nevada	36	1½c	June 29,	Aug 1, Aug 29	C E Elliot, 309 Montgomery
Hale & Norcross S M Co, Nevada	101	50c	June 21,	July 27, Aug 18	A B Thompson, 309 Montgomery
Inyo Marble Co, Cal	20	5c	May 22,	June 26, July 20	W W Sargeut, Mills Bldg
Justice M Co, Nevada	54	10c	May 15,	June 19, July 7	R E Kelly, 309 Montgomery
Lady Washington Cons M Co, Nevada	9	10c	April 18,	May 23, July 11	L Osborn, 309 Montgomery
Peer M Co, Arizona	16	5c	June 8,	July 12, August 2	A Waterman, 309 Montgomery
Occidental Con M Co, Nevada	18	10c	June 22,	July 26, Aug 17	A K Durbrow, 309 Montgomery
Peerless M Co, Arizona	20	5c	June 15,	July 20, Aug 10	A Waterman, 309 Montgomery
Red Jacket Cons M Co, Nevada	1	5c	May 24,	July 15, August 5	S M Capp, 415 Montgomery
Savage M Co, Nevada	81	25c	June 20,	July 25, Aug 14	E B Holmes, 309 Montgomery
Silver Hill M Co, Nevada	33	5c	May 25,	July 5, July 28	D O Bates, 309 Montgomery
Utah Cons M Co. Nevada	18	10c	June 16,	July 18, Aug 5	A W Havens, 309 Montgomery
Weldon M Co, Arizona	7	5c	June 15,	July 16, Aug 9	A Waterman, 309 Montgomery

MEETINGS.

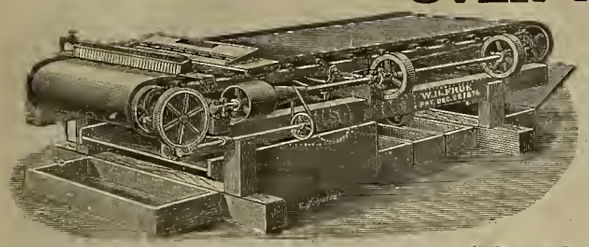
COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Best & Belcher M Co, Nevada	Annual	L. Osborn, 309 Montgomery St	July 18
Dora G M Co, California	Annual	J. Blumenthal, 415 Montgomery St	July 27
Overman M Co, Nevada	Annual	G D. Edwards, 414 California St	July 13
St. Charles G M Co, California	Annual	F F Ryer, Chronicle Buildlog	July 8

DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE
Bulwer Cons M Co, California	5	L Osborn, 309 Montgomery	Oct 20
Champion M Co, California	10	T Wetzell, 310 Pine	May 15
Cons New York M Co, Nevada	10	C E Elliott, 309 Montgomery	Feb 15
Great Western Quicksilver M Co	25	A Halsey, 328 Montgomery	Oct 3
Mayflower Gravel M Co, California	10	D M Keut, 330 Pine	June 30
Pacific Coast Borax Co., California	1 00	A H Clough, 230 Montgomery	Jan 10
Standard Cons M Co, California	10	J W Pew, 310 Pine	July 25

FRUE ORE CONCENTRATOR

OVER 8200 IN ACTUAL USE.



Manufactured under Patents of April 27, 1880; September 18, 1883; July 24, 1888; and March 31, 1891.

GLADSTONE MINING COMPANY, C. J. Clark, M. E. Gen'l. Supt. FRENCH GULCH, Calaveras Co., Cal., Dec 12, 1891.

MESSRS. ADAMS & CARTER, San Francisco, Cal.—DEAR SIRS: During my experience in mining and milling, I have used twenty-four of your four-foot Frue Vanners on different kinds of ore, both gold and silver. I have made competitive tests against them with other widely puffed-up concentrators and have always found the FRUE in first place. When I built this mill (20 stamps), I determined to put in six-foot Frues in order to save space and machinery. I am now running four of your six-foot machines and they have been going for TWELVE MONTHS. They are taking the pulp from 20 stamps, crushing a minimum of fifty tons per day, and do better work than the four-foot tables. They require no more attention than a four-foot table and handle at least twice the quantity of ore. I have run them up to 80 tons per day and could not see that they were crowded. They stop and start as easily as the smaller tables and have the advantage of double capacity with the same bearings and wearing parts, requiring no more oil, and no more wear and tear than the smaller tables. My repair account for the past six months has been too small to mention. In order to give an idea of the work they are doing here I will state that the ore has varied monthly from $5 to $20 per ton and the tailings from nothing to 60 cts. per ton. I will conclude by saying that I cannot endorse the six foot Frue Vanner too highly, and it is the only table that I would have in my mill.

C. J. CLARK, Gen'l Supt.

Price of 4-foot wide Plain Belt Frue Vanner..... $550, f. o. b.
" " " Improved Belt Frue Vanner..... 800, f. o. b.
" 6-foot " Plain Belt Frue Vanner..... 800, f. o. b.

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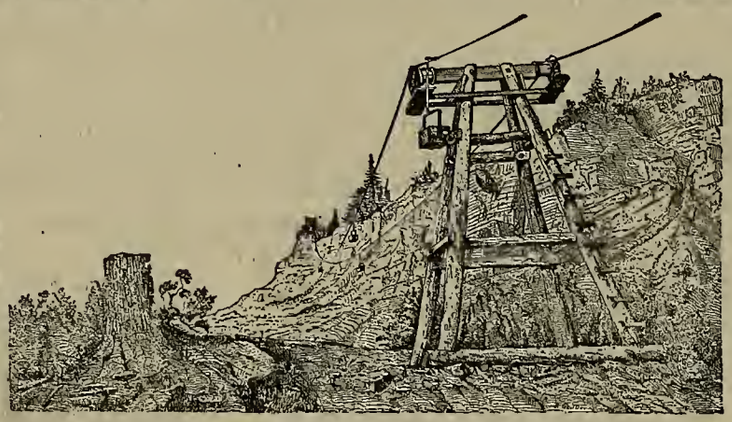

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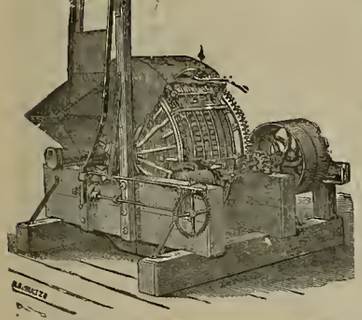

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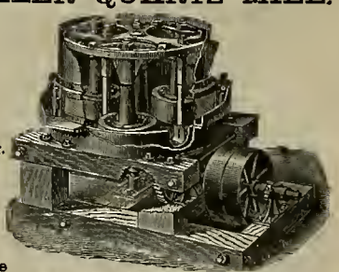
The Deane Steam Pump, Armington & Sims Engines, Leffel Water Wheel of the W. C. Leffel Engine Co.



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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Mechanics and Popular Science.

VOL LXVII.—Number 2.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, JULY 8, 1893.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

Queer Ideas About Miners.

A number of students from the Stanford University, under the assistant professor of mineralogy, have been making a geological tour in Shasta county, collecting specimens of ores and minerals, fossils, etc. The account of their trip states that they left here in June "togged out in typical mining costume, laden with pistols, shotguns rifles, knives and geological hammers." It is probable, now that they have retnrned, that they have found out that there is no typical mining costume and that miners or prospectors carry none of these weapons these days, and never have geological hammers. It is strange how the public cling to the Bret Harte style of miner, who has long since passed from the realm of reality into that of romance. Miners or prospectors at work dress much like other working people. They all wear old clothes and few, if any, carry weapons. The pistols, rifles and knives are found no more frequently upon the miners than upon farm hands in this State. A man going around a quiet camp or region with weapons strapped to him would he laughed at as a tenderfoot. Of course, on a long prospecting trip a shotgun or rifle might he carried so as to get game, or a pistol might be worn. But, as a general thing, these things have disappeared from the miner's life, simply because there is no need for them whatever in California.

Most of the miners of this State are now men who work for wages by the day or month. As a general thing they do not go around swaggering with revolvers looking for a tougher man to have a row with. This kind of bar-room miner is rather out of style in California in these times and does not work in the mines to any extent. Mining in this State has got down to a business basis just like any other industry, and the men connected with it have to behave themselves or they get no work. Drinking men are not wanted, steady men can get steady work, but the swaggerer with a revolver strapped to him is not in demand as a miner.

Aside from the armory which the Stanford students considered it necessary to take, their geological hammers would be a dead give away as to their mining experience from a practical point of view. Scientific men may carry them, but miners or prospectors as a general thing care little and know less about geology or geological hammers. As a matter of fact geology being to them as a class, a sealed hook, they do not take much stock in the men who understand that science, without having much experience in the practical points of mining.

They argue that geologists do not discover mines, and people do not employ them to superintend or work one. They may find out some things the miners do not know, hut the miners also find out many things they do not know. From the money-making view the miner has rather the hest of it. Therefore he cares little for the geological hammer when he prospects, finding a much more useful implement in a pole-pick, which has a business end as well as a geological end, so to speak. The business end will get a rock out and the other end break it up.

A kid-glove miner with a geological hammer, a revolver and a "typical mining costume" is more apt to excite ridicule than admiration among the California mountains. A trip or two will, however, tone a man down as a usual thing, and he will then dress like an ordinary mortal and cease to make a guy of himself. Mining engineers of experience understand this perfectly.

Fig 2.

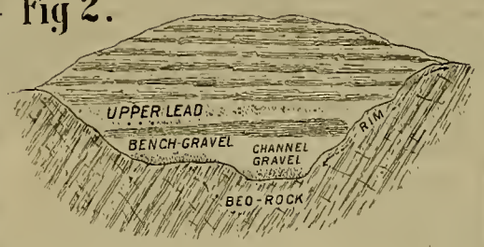


Fig 1.

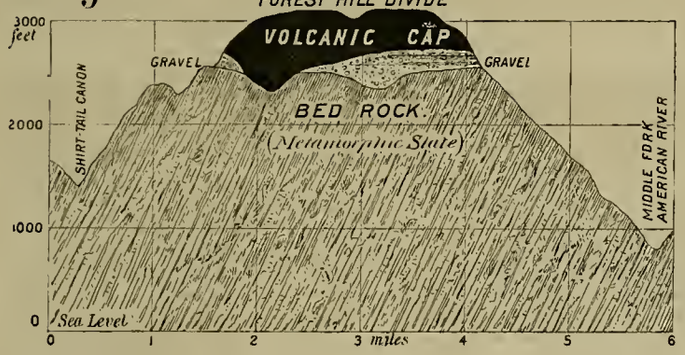


Fig 3.

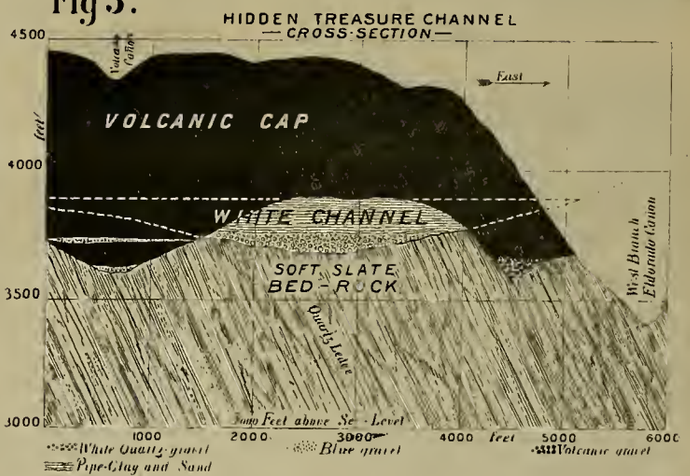
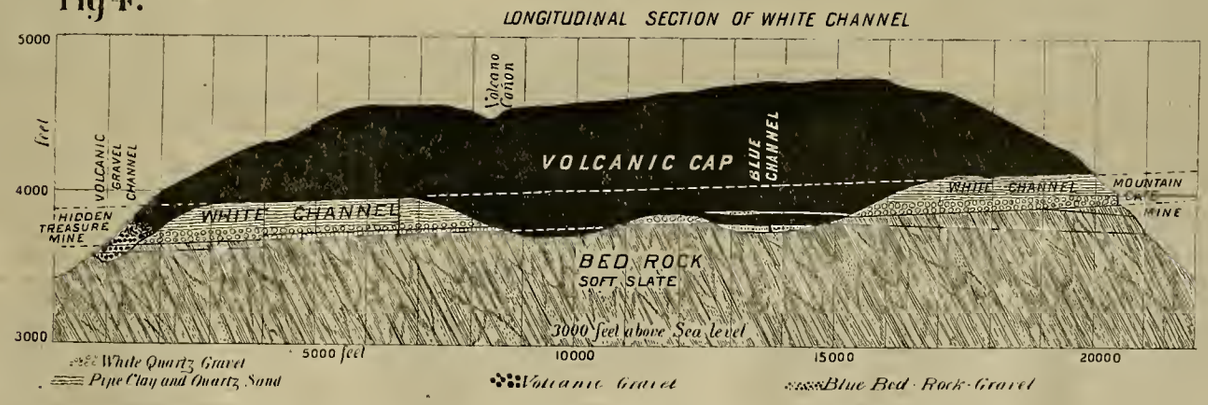


Fig 4.



SECTION OF DRIFT MINING CHANNELS ON THE FOREST HILL DIVIDE.—*See Page* 19.

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Comment.

Notwithstanding the fact that thousands of mines all over the West must remain idle for some time to come, owing to the decrease in value of silver and lead, the law requires that annual expenditure shall be made on all of them, whether worked or not, unless Government patent has been granted. A correspondent, in a letter in another column, makes the suggestion that an effort be made to have this provision of the mining laws suspended for the present, in view of the situation. If men of prominence in the mining industry would make an effort in this direction they would be benefited themselves, and the smaller mine-owners would he grateful for their help. It is not only the mere actual outlay of the mine itself, but the cost of the assessment work is greatly added to in many cases hy the distance from the railroad. Under present conditions there is no earthly use doing anything on these mining claims, yet the work has to be done else the claim and all expenditure on it up to date is lost. It must be confessed it is very difficult to make Congress pay much attention to the mining laws, or force upon it a knowledge of any evils which may exist in them; yet, if united effort he made under the present circnmstances, there may be some hope of accomplishing this.

The prospects of the Midwinter Fair to be held in this city are much better than could have been anticipated a few weeks ago. The sum of $330,000 has already been subscribed, which, for a community in the midst of "hard times," is a pretty good showing. It is desired to have a total amount of $500,000 and it is expected that there will he no difficulty about raising this. A site has heen selected in Golden Gate Park for the buildings, which will be four in number. Of these the most elaborate and beautiful will be the manufacturers' and liberal arts building, for the reason that it will be a permanent one, and after the exposition is over will be presented to Golden Gate Park for a museum huilding. The other huildings will be the hall of agriculture and horticulture, the art palace, and machinery hall. The States of Washington and Colorado may also erect buildings, and Arizona, Oregon and Nevada will assist in making the Fair a success. The foreign exhibitors at the Chicago Exposition are expected to bring their displays here and will doubtless he followed by many domestic exhibitors. It is understood that the railroad companies will make a very cheap rate of fare, which, in fact, must he done, to induce any large amount of people to come from the East. The Executive Committee in charge of the project express themselves as well satisfied with the outlook and are hard at work perfecting the plans.

Several of the leading mining men of Montana issued a call for a convention of silver miners, to take place July 6th, at Helena, in which they say: "We invite your most serious consideration to a fact not creditable to the silver miners of Montana; i. e., that while the representatives of every interest of the United States are preparing for this great conflict, the producers of silver are inactive, irresolute and idle, waiting in dumb dismay for something to turn up, instead of proceeding themselves to play a part in determining results clearly within their reach. In view of the situation we take the liberty of asking all mine owners, proprietors of reduction works, and all others interested in the production of silver, to meet in convention at the Broadwater hotel, near the city of Helena, on the 6th day of July, where it is hoped a perfect organization will be perfected, so that silver producers will bear their own fair share of the burden of the battle that is now on. We feel that we have a right to demand your personal attendance, or that you be represented by a person with full authority to act for you and your company." The fact here stated has been previously commented on in other States, that is, that the silver mining companies have let others do the fighting for the white metal and have done little themselves. We have had a parallel case here in California, where many persons owning hydraulic mining properties have not put up a cent, or given any other kind of assistance toward the rehabilitation of the industry. The men who have taken the most active steps have no personal interest whatever in any hydraulic mines. In the silver fight the silver producers must now join and do something in a practical way. Montana is largely interested in this subject because eight or ten thousand men have in the last week been thrown ont of employment by the closing down of the silver mines.

President Cleveland has issued a proclamation to convene Congress in special session on August 7th, and then the great battle for and against silver will be fought. He says: "The present perilous condition is largely the result of a financial policy which the executive branch of the Government finds emhodied in unwise laws which must be executed until repealed by Congress." This is, of course, the Sherman law, which requires the purchase of 4,500,000 ounces of silver by the Government per month. It is over this that the contest will be. Already the "silver men" are marshalling their forces. The American Bi-metalic League has issued from national headquarters at Washington, a call for a national convention in Chicago on August 1st. All members of the league are urged to attend, and all who favor maintaining the money of the Constitution and who are opposed to the establishment of the single gold standard in the United States, without regard to party, are invited to attend and participate in the deliberations of the convention. All economic associations and all industrial organizations are requested to send delegates to the convention. A special invitation is extended to the members of Congress and the members of State Legislatures. The Governors of the States are requested to appoint as many delegates as they deem proper. The idea of the silver men is to meet at Chicago and adjonrn to Washington. Here the convention will assemble about the time that Congress convenes. The object is to impress Congress with the strength of their cause and to present such arguments as may aid it.

Mining men say it is now immaterial how low silver goes. Having gone below 80 cents, the effect is just the same as if it were 60 or 50, hecanse the mines have to close. Profitahle silver-mining nnder present conditions is impossible. Ore-buyers have ceased to buy, smelting works have closed down, the big mining companies have ceased operations and leasers have stopped work. This is not a local condition, but exists in all the silver-mining regions. While the smelters elsewhere are stopping work, the Selby Smelting and Lead Co., with main offices in this city, continue as usual and have plenty to do. Under their system the silver is sold as soon as in condition for market, and their silver account shows a profit. These works are rnnning as usual and intend receiving such ores, concentrates and hullion as may be shipped to them, and will make prompt settlement as hefore. Ore-shippers should remember this fact, while so many other smelting works are declining to receive ores and announcing their intention of suspending operations until the silver question is settled.

THE SOUTHWEST SILVER CONVENTION.—This convention, which was held at Silver City, N. M., adjourned on Wednesday to meet at Albuquerque during the Territorial Fair next fall. A number of able speeches were delivered, including those hy Governor Thornton and H. B. Fergusson of Albuquerqne. The resolutions which were adopted demand the repeal of the Sherman law and the enactment of a law providing for the free and unlimited coinage of gold and silver at the mints, at the ratio of 15.98 of silver to one of gold as the effective and only relief from the present deplorable financial condition.

Product of Silver in the United States.

The Government has more difficulty in estimating with accuracy the annual output of silver from the mines of the United States than it has with the gold product. The silver purchased by the Government consists very largely in the finished product of private works. These bars contain large quantities of foreign as well as domestic silver. The great bnlk of the silver product of our own mines, together with all the smelting ores and base bars imported into this country go to private works for reduction and refining. There are no facilities at the mints and assay offices of the United States for treating ores or very base bullion. Moreover, Government institutions do not offer the same advantages to producers of silver as do private establishments, for the reason that no allowance is made at Government institutions for the value of hase metals commonly associated in nature with silver, such as lead or copper, which are paid for at private establishments and constitute a very valuable component of such product.

The product of silver, moreover, passes through many hands before it reaches the mints or is exported in the shape of fine silver bars. In the first place, it is usually sampled by ore-dealers; from there it then finds its way to smelting works, where it is made into base bars, and from there to private refineries, where the hase metals are separated from the precious metals, and the precious metals in tnrn refined into bars of practically pure gold and silver. This is then ready for the mints It is thus seen that private establishments do all the preliminary work with the bullion, before the mints take it.

We were informed by the president of the Selby Lead Works that the silver offered by them to the U. S. Mint in this city on Wednesday, was declined. Dispatches from Washington, state that on that day 530,000 ounces of silver were offered to the treasury, but there were no purchasers. Acting Mint Director Preston did not purchase any silver, as he considered the offers made were too high. He did not, as he has done recently, make any counter offers. Small lots were offered at .7545 per ounce, but most of the prices ranged from .769 to .760. Inquiry at the Treasury Department as to whether the amount of silver offered the Government is as large now as formerly developed the fact that for the first six months of the cnrrent calendar year the offsrs aggregated 52,300,000 ounces, while for the same period last year they were only 45,350,000, showing an excess for the corresponding period this year of 6,950,000 ounces, which would indicate that the production of silver is not falling off in the United States. The amount of silver bullion imported for the first six months of the current calendar year, including that in ores, was $8,471,000 ounces, while there has been exported 11,968,000 ounces. Of the amount of silver offered the Government during this period 27,000,000 ounces were purchased.

It is important to note that importations of base silver bars, and especially of argentiferous lead ores from Mexico, South America and British Columbia, steadily increased in quantity last year notwithstanding the low price of silver and the import duty imposed npon the metallic lead contained in imported silver ores. It is almost impossible to separate the mass of silver coming in various forms and nncertain quantities from the product of our own mines. For these reasons the Director of the U. S. Mint finds it difficult to estimate with accnracy the output of silver from onr own mines as contradistinguished from the outpnt, in the shape of fine silver bars, from private works representing the product of foreign as well as domestic silver. In the PRESS of last week were given the figures showing the relative yield of silver of the different States of the Union. In 1892 there was a smaller aggregate silver product by 330,000 ounces than during the year 1891. However, the largest silver producers, Colorado and Montana, increased their product materially, the falling off occurring in Nevada, Idaho and Utah.

The product of silver from the mines of the United States, as estimated annually by the U. S. Mint Bureau, since 1873, may be recapitulated as follows:

PRODUCT OF SILVER FROM MINES IN THE UNITED STATES, 1873–1892.

Calendar Years.	Fine Ounces.	Commercial Value.	Coining Value.
1873	27,650,000	$35,750,000	$35,760,000
1874	28,849,000	36 869 000	37,300,000
1875	24,513 000	30,519 000	31,700,000
1876	30,069,000	34,690,000	38 800,000
1877	30,783,000	35 970,000	39,800,000
1878	34,960,000	40,270,000	45,200,000
1879	31,550,000	35,430,000	40,800,000
1880	30 320,000	34,720,000	39,200,000
1881	33 260,000	37,850,000	43 000,000
1882	36,200,000	41,120,000	45,800,000
1883	35,730,000	39,680,000	46,200,000
1884	37,800,000	42,070,000	48,800,000
1885	39,910,000	42,500,000	51,600,000
1886	39 440,000	39,230,000	51,000,000
1887	41,261,000	40,410,000	53,350,000
1888	45,780,000	43 020,000	59,195,000
1889	50 000,000	46,750,000	64 646 000
1890	54 900,000	57,225,000	70,465,000
1891	58,330,000	57,530,000	75,417,000
1892	58,000,000	50,750,000	74,989,900

THE Northwestern University, at Chicago, has established a chair on mineralogy and invited Prof. A. R. Crook to fill it.

The Gold Producing States.

The fntnre of the Black Hills as a commercial and mining conntry is assnred and the realization is close to dawning. This is pre-eminently a gold conntry, the yellow metal predominating over the whlte to snch a degree as to almost sxclnde the lattar. With silver qnoted in the seventies and gold approaching a preminm, the advantage of this condition is apparent. In Colorado and other silver-mining States the depression of silver has cansed over 50 per cent of the mines to close down, while in the Black Hills prospecting was never before prosecnted so persistently, while every dey adds to the list of prodncing mines. For this reeson the Bleck Hills has felt hnt lightly the financial stringency and will early rally from the depression. Then, as confidence begins to be restored, investors will turn to a field where gold-beering properties can he had, and the hulk of money designed for investment in mines will find its wey to the Black Hills, drawn hither by conditions thet exist nowhers elss in America. A few months will witness this chenge end a few yeers will emphasize it. For every prodncing mine now there will then be hnndreds, and for every reduction plant now there will then be ten. The cities of the Bleck Hills will increase in popnletion repidly end the entire section become the weelthiest, most popnlons end importent mining section in the world.—Deadwood Pioneer.

If the South Dakota people can thus strongly congratulate themselvea on their gold mines, what should we in California do with many more of such mines and an annual gold pruduct three or four times that of South Dakota. The *Pioneer* is a little mistaken in its statement that " such conditions exist nowbere else in America." It has possibly forgotten all about California es a gold prodncer, though this Ssate still leads the list by a long distance.

Tbere are only four States of the Union which produce over two millions in gold per annum. These are California, $12,571,900; Colorado, $5,539,021; South Dakota, $3,942,495, and Montana, $2,966 572. The figures are those reported by the U. S. Mint officers and agents for the year 1892. The relative product of these States has differed little in the past few years. The closing of the silver mines would reduce the gold product of Colorado more than any of the others, since some of her gold issues from her silver mines. California and South Dakota get some of their gold product from silver properties, so there is not apt to be any reduction in gold output from these two States. Montana will not be affected so much as Colorado in tbis respect. Both in Colorado and Montana more search than usual has been made for gold ores, and this interest will be hightened in the future by reason of the closing down of the silver mines.

From the figures given above, it will be noticed that California is still a long way ahead of even the second one in the list—Colorado—in the matter of annual gold product. There is no probability of any reduction in the annual yield of California, because all its gold comes from gold mines, and none from any worked for silver, which might be closed down. In fact there is a strong probahility that the yield of California will be materially increased by reason of the partial resumption of work in the hydranlic mines under the provisions of the Caminetti act, which is now in force. None of the minea of the State have yet started work under the requirements of this law, though preparations are heing made to do so.

It reqnires no argument after a casual glance at the figures of production qnoted, to show that California is pre-eminent in gold mining. It always has been in that position since gold was discovered within its boundaries. The exhaustion of the rich placers of early days naturally reduced the annual prodnct of the State; but for a number of years the amount yielded has varied little. It is now susceptihle of increase, however, for the reason stated.

If, then, as may reasonably be expected, mining investors are now in search of gold properties, this is the State to which their attention will natnrally be turned. South Dakota will douhtless attract many, but it ia not a fact that it has "conditions which exist nowhere else in America." There is no disposition to detract from the known merita of the Black Hills gold-mining region, but a richer and more productive one exists in this State, and California should he the first to feel the influence of the desire to ohtain gold-producing properties.

REDUCTION WORKS DESTROYED.—On Sunday last the Pioche Consolidated leaching works and mill at Bullionville, Nev., were entirely destroyed by fire. The flames were first seen at the eastern end of the mill, about noontime. The response to the first cry of fire was almost instantaneous. The pumps were in motion in 30 seconds, and before the whistle sounded everything at the engine-room was under perfect control. Forty thousand gallons of water in the fire tanks above the mill, a thousand feet of hose and connections as additional precautions proved altogether unavailing. While nothing is known as to how the fire started, it is supposed to have been caused by some sparks falling in the woodpile east of the building. The mill had just been improved at an expenditure of $50,000, making a total cost of $150,000. It was practically a perfect modern leaching plant.

Ancient River Beds of the Forest Hill Divide.

The Forest Hill Divide, one of the nnmerons spur-like ridges of the western flank of the Sierra Nevada, is in Placer county, between the north and middle forks of the American river. The ridge line is uuiformly graded and unbroken for 25 miles or more, extending from an altitude of 5,800 to 2,300 feet above sea-level. Midway between these points the ridge branches, the northerly branch being the Iowa Hill Divide, and the southerly, or main branch, the Forest Hill Divide proper. An examination of the district shows that the hases and main bodies of these ridges are composed of metamorphic rocks of graat age, and that there are commonly exposed on the summits large accumulations of volcanic material and extensive river deposits of a comparatively recent geological epoch. In a popular sense, however, these deposits are decidedly ancient, and they have been appropriately credited to an ancient river system. A characteristic cross-section of the Forest Hill Divide is given in Fig. 1 of the accompanying engravings, which we take from an article by Ross E. Browne, M. E., in the last published report of the State Mineralogist, condensing also the descriptive matter.

The River Deposit consists of well-washed bowlders, pebbles, and sand, composed of the harder materials eroded from the bedrock—mostly quartz and siliceous rocks. Clay strata are of frequent occurrence, particularly in the upper portion of the deposit. Trunks of trees, commonly cedars and oaks, are found imbedded in the upper layers, either petrified or somewhat lignitized. Certain layers of the gravels thus formed have become strongly cemented, owing, probably, to the percolation of siliceous and calcareoua waters. The color is gray, blue, green, reddish brown, or white, according to the material, as well as the degree of oxidation of the iron in the cementing substance.

Gold occurs throughout this deposit in the form of rounded nuggets, scales, and dust. This occurrence is the result of the breaking and grinding of fragments and bowlders of the gold-bearing portions of the bedrock. By a natural process of concentration the bottom layer of each deposit of gravel has become, as a rule, the richest.

That these auriferous gravels are river deposits, was but one of a number of theories advanced during the first decade of active mining operations. The theory was well established, however, by Professor Whitney, in his earlier work as State Geologist, and the accumulating evidences have long since become conclusive.

The Volcanic Cap consists of massive layers of beds of light gray, reddish brown, and dark-colored cements and conglomerates. It contains large bowlders and fragments of volcanic rocks, and in its bottom layers occasional trunks and branches of trees somewhat lignitized. It carries no appreciable quantities of gold, and is, in fact, the barren material of the district.

Between these massive beds are layers of gravel, marking distinct periods in the flow.

The Forest Hill Divide has been for thirty-nine yeers an active field for mining enterprise. There have been exposed by hydraulicking many sections of the river deposit and extensive areas of the river beds; and by drift mining a number of the channels have been explored and worked continuously for a mile or more of their lengths.

Of the mining terms used it appears necessary to define a few only: "Channel" refers to the deeper portion of the continuous trough-like bed of the river; "rim" to the sides of the trongh, from the line above where the bedrock begins to pitch down, to the shore line of the bottom layer of gravel filling the channel; "npper lead" to an upper layer of pay gravel; "bench gravel" to a patch of an earlier deposit of gravel remaining in place after the greater portion has heen washed away.

The network of channels under the volcanic cap is rather confusing. There are evidences of a numher of channel systems, each representing a partial or complete displacement of the stream, a distinct cut, and a special deposit of gravel.

The series of volcanic eruptions in the high Sierras had a marked effect upon the watercourses and has enabled a ready grouping of the channel systems according to three important periods, covering the time before, during, and after the series of eruptions.

Prior to the first important flow of volcanic cement, this period is represented by a system of continuous valley-like depressions in the bedrock, from a thousand to several hundred feet in depth and several miles in width, and containing broad river heds filled with gravel to very considerable depths. The rivers, in eroding the bedrock and forming these depressions, left a succession of broad, flat benches with shallow accumulations of gravel. The channels naturally followed, to a great extent, the belts of soft slate. This slate is easily eroded, alacks readily, and is washed away in the form of a fine silt. Quartz is the only important material contained in the helts which is hard and permanent enough to resist the destructive action of the current. Owing to these facts we find in the filling of the channel, for long stretches, quartz gravel and qnartz sand almost to the exclusion of other materials. The white channel of the Mountain Gate and Hidden Treasure mines is a striking example (see Fig. 3).

The channel is filled to a depth of 50 feet, and a width of one-third of a mile, almost exclusively with smoothly washed bowlders, pebbles, and sand of pure white quartz. On top of this, to a depth of 150 feet or more, and an original width probahly exceeding a mile, the filling is quartz sand and sandy pipe-clay. The course of these belts of soft slate being south, or somewhat east of south, and not entirely continuous, and the general slope of the surface being to the southwest, the channels occasionally break across the harder belts of bedrock. The quartz gravel decreases in quantity, and there are substituted pebbles and bowlders of equally hard siliceous metamorphic rocks. There appears no conclusive evidence of the occurrence, during this period, of any disturbances to cause a wide diversion of the watercourse, and Mr. Browne is unable to say whether the period is represented hy one large channel system only, with its tributaries, upper leads, and benches on the valley slopes, or by several such systems.

The first important volcanic eruption in the high Sierras changed the conditions. A mud composed of fine volcanic material was delivered to the river bed and washed down its course, spreading over the gravel to a considerable depth, solidifying and sealing the river deposit. The streams were diverted by the cement cap thus formed, and the first period came to a close.

Second Period, or period of the series of volcanic cement flows.—The capping of the older channel deposit occurred in a succession of flows. The watercourse was several times diverted by the heaping masses of volcanic materials. During the intervals between the periods of volcanic eruption both shallow and deep narrow channels were cut, sometimes following and partly obliterating the older deposit, sometimes crossing and leaving the deeper portion of the older bed altogether. Some of these later cuts are higher than the earlier; several of them, however, passed entirely through the older deposit and 50 to 100 feet deeper into the bedrock. (See Figs. 3 and 4)

The " blue channel " and the " volcanic gravel channel," shown in the section, represent two such cuts. The " blue channel " contains, in its lowest depression, five to fifteen feet of bedrock gravel of a grayish-blue color, and on top of this eighty feet of cement, then a layer of four five feet of bedrock gravel; and on top of this again, cement. The " volcanic gravel channel " contains a large hody of coarse gravel, composed mostly of volcanic rocks, and to a small extent only of bedrock. These two channels represent distinct systems. The volcanic gravel channel is doubtless the later of the two; possibly the latest of the deep channels of the period. The final bed of the period was filled with coarser cements and conglomerates to a great depth. Volcanic eruptions in the high Sierras ceased altogether, and thus the cause of frequent diversions of the watercourse disappeared.

Third Period, immediately following the last important flow of volcanic cement and extending to the present time.—There still remains of the volcanic cap from three hundred to one thousand feet in depth. The ancient valley was filled to depths even greater than these, and there resulted a wider and more permanent diversion of the watercourses than heretofore. The streams started new channels, probahly along the marginal lines of the cap, cutting across the cap at the juncture of tributaries of early periods, and ultimately obliterating the greeter part of the deposits of the first period and a large part of the deposits of the second period. These streams, undisturbed by volcanic activity, have continued to cut, forming eventually as the forks of the American river the deep canyons of the present day.

Auriferous Conglomerates of the Witwatersrand.

The Pecullar Occurrence of Gold in the Famous South African Camp.

At a recent meeting of the Federated Institution of Mining Engineers in London, Mr. F. G. Shaw read a paper on tbe auriferous conglomerates from which so much gold is now being taken at tbe South African Camp of Witwatersrand. This paper will interest many gold miners in this State, for though the material carrying the gold has to be crushed in mills, it is conglomerate or gravel and not quartz, though it is mined like quartz, and is different from anything we have in California.

In Mr. Shaw's paper certain theories were advanced as to the manner in which the auriferous conglomerates of the Witwatersrand have been formed, and in wbich the gold now found crystallized in tbe matrix of these conglomerates has been deposited. These auriferous conglomerates were first worked in 1887, near Johannesburg in tbe Transvaal, and from an isolated part of the extensive conglomerates which are common to the sandstones of South Africa. The basin has an east and west length of about 50 miles and a supposed breadth of about 40 miles. The east and west

ends are very much dislocated and faulted. The dip of these conglomerates appear to be governed by intrusive masses of trappean rock, which run parallel to the northern and southern outcrops, and have elevated the edges of the beds to angles varying from 12 degrees to 60 degrees. These seams, the author expects, will assume a horizontal position at comparatively short distances from the tilted outcrops, save where locally displaced hy intrusive masses of igneous rocks which are occaslonally seen cropping out. Although no deep horings have proved the existence of these beds ln the middle of the syncline, the continuity of their upturned edges and the regularity of their disposition, together with their known extent over South Africa, have impressed geologlsts with the conviction of their existence, and from 2000 to 15,000 feet have heen assumed as the probable depth reached by the lowest levels of this syncline.

The assumption is that these beds of conglomerates exist over an area of nearly 2000 square miles; the regularity of their width and character is well proved; and the gold up to the present time appears to he regularly distributed through the reefs. The importance of this field can he hest understood by the output of gold which was for its sixth year 1892, 1,210 868 ounces, a greater output than any other single field of slmilar age in the world. During the first year of its history, 1887, this field produced 23,115 ounces. This is equalled hy the present weekly output. The conglomerates of the high veldt of South Africa, the manner io which they were spread over so vast an extent of country, and the precipitation of gold in them is a most interesting subject, but as the main reef seam at Johannesburg, with the attendant parallel seams, are the most interesting from their auriferous character, this paper will he to a certain extent confined to them. Up to the present time geologists and mining engineers have alluded to these conglomerates as being a sedimentary or sub-aqueous deposit and the gold, if they mention it at all, as being of an alluvial character and mechanically deposited. On this latter point Mr. C. J. Alford is, perhaps, an exception. In his hook on *The Geological Features of the Transvaal*, he says, "it appears certain that the gold was not transported to its present position in the form of native gold by the action of water; its origin is a curious and interesting problem." With reference to the conglomerates themselves, the terms sedimentary and sub-aqueous are hoth too indefinite, and the author prefers to assume that these conglomerates have been spread over the large surface in which they now exist and with the regularity which is one of their notable features, by a sea-heach action. The general assumption has been that they have been thus spread over the sandstones in which they are conformably interbedded by the action of rivers, or currents in the seas, at the bottom of which they are supposed to have been deposited.

While the action of rivers undouhtedly accouots to a great extent for the transportation and collection of rounded pehhles, gravels, etc., in all parts of the world, no river action, that the writer has any knowledge of, could have so regularly spread over so large an area the seams of pebhles uow forming these conglomerates. Even if they existed only io the basin of the Witwatersrand, a river at least 45 miles wide and of most peculiar character would have had to exist, which for a certain period would have had to deposit over its eotire hed a uniform depth of pebbles, and then have had to deposit over the same extent a layer of sandstone for even a longer period, this action again being followed by the deposition of another layer of pehbles, then by another layer of sandstones, and so on, uotil these numberless layers of conglomerates, saodstones, etc., had been deposited. He knew of no analogous pheoomena in any river hed, and even were such phenomena known on a small scale, he could conceive of no river whose bottom would he so regular and uniform as these layers of sandstones and conglomerates would imply, especially when the more violent action of rivers and currents in those days are considered. These facts should dismiss the river-hed theory as being improbahle, and eoable the writer to turn to the actlon of currents existing in a sea, by the aid of which pebbles hrought to the edge of that sea would be spread evenly over an immense distance on its hottom. Such a regular layer of pehhles, which marine research has not yet discovered, would take a considerable number of years to form, and would have to he followed by a total cessation of pebble deposit, a layer of sandstone detritus taking its place and being deposited io the same ocean, these would then have to he followed in successive order by pebble and sandstone deposits uotil the parallel seams now fouod had been formed. This view would necessitate a current in the ocean so regular in its strength and action as to carry these pebbles smoothly and eveoly over the greater part of South Africa. No such current actiou is known at present in the ocean, the general tendency being to form banks and to heap up such coarse detritus as pebbles instead of laying them eveoly over the floor of the sea, and certainly no river flowing into an ocean would by its own action be able to spread its burden except in the vicinity of its mouth. The writer could therefore accept either of these theories as beiog the reasonable and common sense explanations of the distribution of these conglomerates, and he preferred to assume a progressive seabeach action, which gradually spreads the pebbles brought down by the rivers, etc., from the, probably at that time, highland of Central Africa, over the theo low-lying ground of the South African continent.

The author then went back to the time when our sphere was in a molten state surrounded by ao enormous thickness of atmosphere containing in suspension all the minerals whose point of evaporation was below that of the atmosphere, and gradually losing by radiation a portion of its heat. The formation of a film or crust would, he said, be the first real change on its surface, and as this crust became sufficiently thick to resist for some time the ebullition of the molten mass below it, the exterior portion would gradually become sufficiently cool to allow of the condensation of these various gases, minerals, etc. Many ages would pass during which gigantic igneous eruptions would take place, upsetting and distortiog the the existing rocks until at last the crust was continuous and strong enough to bear a certain superincumbent mass. As soon as the temperature would allow seas would rest on this crust, eruptions would still take place, and hydrothermal phenomena would still be common; but the land would gradually hegin to be of a permanent character. The erupted rocks would harden into hills, etc., upheavals would remain permanent, and depressions would become greater, and the early hydrothermal rocks would hegin to appear, so that in course of time low continents would exist as dry land, and the early sedimentary rocks, mudstones, shales, clays, etc., would be formed. Thus the contlnents would make their appearance, and the early sedimentary rocks he deposited, and on them would be formed in course of time the first sandstone rocks lying horizontally at a little ahove or below the then sea level. These sandstones are found over the whole of South Africa in unbroken layers on the high veldt, with traces of their existence in and over the low veldt, and it may be assumed that the same phenomenon has been responsible for their existence, and that the land ahout the time of their creation was suhjected to the same laws. These sandstones were undoubtedly deposited under the sea action, and it must be assumed that the then elevation of the tongue of land of South Africa was very little, and that it prohably existed as a low land lying to the south of the tropical parts of Africa, whose rivers would carry down the vast amount of pehhles, now spread over and among the sandstones, by the retreating action of the sea heach helonging to the same ocean which deposited the sandstones.

The most generally accepted theory is that the sandstones were formed at the hottom of the sea (which the few fossil remains found in them confirm), and that the material forming the coal measures have heen formed by the tropical growth of vegetation. The operations of an advancing sea over snch low lying lands, fed as it would he by rivers bringing down pehble detritus, slowly creeping over the land, and succeeded by a retreating sea heach action, would surely be accompanied with that of settling the light detritus brought into it as a sandstone deposit, and the spreading out on its edges of a uniform layer of pebbles (oow turned into conglomerates hy the subsequent infilterating action of siliceous waters). In those places in which the inflowing rivers travelled through countrles rich with vegetable growth bringing down in their waters an immense quantity of vegetable matter and gradually laying it down as a heach llne in the retreating course of the sea, making it comparatively speaking a level bed rich with vegetable seeds and with every facility for hringing forth the luxurlant growth from which our coal seams have heen made, during which time would be formed one of those non-continuous lenticular heds of various horizons, which would under the pressure of the superincumbent mass of sandstone be turoed into the coal and shale seams now found in South Africa (until the return of the again advancing sea-beach line many thousands of years afterwards).

The theory which might account for such an encroaching and retreating sea would probably be the gradual elevations of the land, followed by suhsequeot depression, leaving the land at one time exposed to the air, and afterwards covered by the ocean. Whatever was the cause, South Africa has uodoubtedly heen alternately covered hy sea-water and exposed to the atmosphere, and whether the land was alternately elevated and depressed, or otherwise, the sea must have come and gone and a sea-beach action heen thus created. The appearance of the low veldt bears ample testimony to this fact, the mountain ranges bordering the high veldt plateau of South Africa showing by their great denudation the erosive action of the advancing and retreating ocean.

The next and most interesting point is the manner in which the gold has heen deposited in the conglomerates. The author has io his possession two pebbles taken from these cooglomerates, which each cootain a colour of metallic gold. These pebbles prove that from whatever source, and from what distance brought, some at least were gold-hearing, therefore a certain amount of free gold would be mechaoically deposited in these seams derived from the broken matrix of the more friable and smaller pehhles, by the grinding action of snch a sea-beach as described. Such a class of gold would be fairly well distrihuted and would present the rounded appearaoce of alluvial gold. The gold, however, which is thus accounted for, forms but a small proportion of that carried in the reef. Mr. Alford says in his work, that "so far as he has noticed the gold is almost invariably in a more or less crystaline form, the cube in its defined forms being more or less detectable." The result of the author's investigations have been to confirm those of Mr. Alford, and led him to a careful study of this subject, and it was only after a diligent search that he became coovinced that the character of the matrix now holdlog the pebbles together had altered since those pebbles were origioally deposited and that the siliceous matrix now in the cooglomerates was pseudo-morphic in character. He is therefore inclined to believe that the original matrix, whether of argillaceous, calcareous, or felspathic nature, must have been displaced and a pseudo-morphic matrix carrying gold, sulphur, iron, etc., has taken its place, and his reasons for thiokiog so are as follows: In the oxidised as well as the unoxidised portioos of these conglomerates the pebbles are held apart by a distinctly crystalllsed matrix of silica. Now, in whatever manner these beds were spread over so large an area it cannot be imagined that the pebbles themselves sunk ioto a firm, jelly-like mass of silica and remaioed more or less suspended in it, even if oxide of silicon ever assumed so consistent and glutinous a character.

It is probable that an after crystallizatioo of the matrix must have taken place, together with a deposition of its containiog minerals, and may be accounted for in the following manner: After the gradual laying down of these conglomerates, etc., intrusion of igneous rocks took place, and the vast horizontal beds of sandstooes, etc., were in some places broken up and tilted, as in the Witwatersrand basin, and so acquiring a dip would either form natural dralns for iofiltrating surface waters or funnels through which the underground thermal waters, laden with their store of minerals, would force their way upward (through the fissures dislocating these seams, and caused by the upward action of trappean rocks), and reach the surface. In either case the silicon contained in these waters would crystallize in its passage through the conglomerate, and form the matrix that contained the minerals now found.

The author then further discussed the question of solutions containing gold, and concluded hy stating that if hls theories as to the pseudo-morphic character of the matrix of the Witwatersrand reefs are correct it is probable that reefs will be found of considerable value and extent in the vicinity of the intrusive dykes which have broken through the sandstones, and his theory will certainly warrant a greater faith in the continuity of gold in these reefs than when it was thought to he of an alluvial character and mechanically deposited.

Mr. Halse said it might interest membors to know that an auriferous conglomerate deposit was now being formed along the bottom of the Ancobra river, which ran into the sea. He did not advooate a river theory for the origin of the hanket formations, but merely showed that it was not impossihle. As for the uniformity of the conglomerates, he helieved they were not of uniform thickness, but sometimes wedged out entirely, and in certain of them the pebbles were of a much larger size than in others. The hankets of the west coast of Africa exhibited little or no metamorphism, faults were rare, and although the beds dipped at an angle of from 30 degrees to nearly vertical, no volcanic rocks occurred in the immediate vicinity to account for this.

Mr. Gibson said the reefs were not consistent or parallel seams, nor was the field a simple field like a coal basin. The heds were very much twisted, and moreover, no single reef was equally rich throughout. There were rich pockets, but not such rich pockets as were met with in quartz veins. The whole of the fields were very much more complicated than had hitherto heen supposed. The heds were not horizontal. The speaker believed the conglomerates were of alluvial origin.

Mr. Henry Louis takes issue with Mr. Shaw, and in a letter to the *London Mining Journal*, commenting on the above paper, says:

"Mr. Shaw makes a statement to the following effect: 'Up to the present time geologists and mining engineers have alluded to these conglomerates as being a sedimentary or suh-aqueous deposit, and the gold, if they mention it at all, as being of an alluvial character and mechanlcally deposited.' I shall be glad if you will permit me to point out how inaccurate this statement is. The first information, so far as I know, regarding the geological character of the banket beds of Witwatersrand in any British puhlication is contained in some hrief notes contributed hy myself to *The Mining Journal* of November 13, 1886 (page 1325). I am not aware that the statements there made by me have ever been controverted, and they are diametrically opposed to the views ascrihed by Mr. Shaw to mining engineers in general.

"The gist of the observations and deductions contained in these notes of mine is to the effect that the banket is 'just such a deposit as may fairly be attributed to the agency of mountain streams depositing in a lake the detritus with which they are laden. It is very noticeable that the gold in these banket heds is not, or only very slightly, water-worn, as shown by microscopic examination, and that no coarse gold occurs in them.' I further pointed out that the formation consists of 'beds of conglomerate more or less consolidated, and bearing gold partly in the quartz pebhles, of which the conglomerate largely consists, and partly in the siliceous material which surrounds these pebbles aod cements them tcgether.' My conclusion at the time was that 'further explorations are, however, necessary to prove whether these curious deposits carry gold uniformly in depth, or whether their auriferous contents are not due to the deposition of gold *in situ* subsequently to the formation of the deposits, owing to the infiltration of gold in solution from the surface. The highly microcrystalline character of the gold suggests this latter hypothesis.'

"You will notice that these views are exactly the opposite of those which Mr. Shaw sets himself to controvert, and with reference to them I hope that you will hear in mind the early date at which they were written (a year before the conglomerates were first worked, according to Mr. Shaw), and the great difficulties which heset any geologist who then attempted to study these formations. I do not believe that there was at the date of that, my first, visit (July, 1886) a shaft on the Raod 20 feet deep, practically all the work having been confined to surface trenching. Nevertheless I had even then little douht that the banket beds would continue in depth, although I was by no means sure that they would continue to be equally auriferous. I still venture to think that the subsequent studies of other geologists have only confirmed the views then first advaoced by me, and which I have not yet seen reason to seriously modify; in fact, they are in some respects the same as those which Mr. Shaw is now setting forth, and I cannot but hold that where we differ the balance of probabilities is in my favor. Thus I think that most geologists will agree with me in ascribiog to these beds a lacustrine rather than a marine origin, what evidence there is on this point, mostly negative it is true, beiog decidedly against the latter assumption. I also believe that my opioion, above quoted, to the effect that most of the gold is not mechanically deposited alluvial, contemporaneous with the pebbles of the beds, but that it has been precipitated in its present position, subsequently to the formation, perhaps even to the upheaval, of the deposit, is generally accepted by independent observers, and that the crystalline character of the gold, first pointed out by myself, is recognized as sharply distinguishiog these deposits from cement beds.

"I need hardly add that, at the time when my original notes were writteo, no such thing as a speck of pyrites had yet been seen in the Rand baoket. The subsequent discovery of its pyritous nature in depth has naturally given greater precision to theories regarding the agencies which have deposited this crystalline gold, but it has not in any way controverted, but rather has amplified, my cruder early views on this subject."

Electrical Power for Mining in Nevada County.

Nevada county is the principal gold-producing region of California, having more productive mines within its boundaries than any other county. The section around Grass Valley and Nevada City has many small as well as many large mines and there is need for power in them all. The development of electric transmission in the past few years has shown that it is possible to utilize the water-power of the South Yuba river by generating electricity and transmitting it to Nevada City and Grass Valley, and a company has been organized at the latter place to do this. The company owns the river from section 24 to section 27, township 17 north, range 8 east, M. D. M. (where the "fall" averages 90 feet to the mile) and all the land on the south bank of the river through which their flume will pass. They claim 10,000 inches of water, which, when diverted at a point in section 24 and carried a distance of three miles through a flume to a point in section 27, will give a fall of 250 feet that will generate over 6000-horse power. The power is to be transmitted from the point of generation on the South Yuba river via Nevada City three and one-half miles distance to Grass Valley, and the mines four miles farther.

It will be seen from the accompanying diagram that from the dam to the power station, a distance of three miles, the natural trend of the river is southerly, thus saving two miles in the length of the wire and shortening the distance that the power is to be transmitted.

The course of the pole line is designated by the line starting at the power station, and running to 1, thence 2, 3, 4, 5, 6, 7 and back to 1 again and completing the circuit. Each square in the diagram represents a section one mile square.

1. Group of mines on Deer creek, one-half mile west of Nevada City, comprising the Nevada City mine, Wyoming, Spanish, Champion, Merrifield, Home, Monntaineer, Providence, etc., etc. This will be a distributing point and from it will be switched sufficient power to supply Nevada City with electricity.

2 Town Talk Summit being the highest point on the high-road hetween Nevada City and Grass Valley, also the summit on the N. C. N. G. R. R., here will be erected a 50-arc light dynamo to light with electricity the Nevada City and Grass Valley wagon road, and from this point power will be transmitted to the Gold Flat, Merrimac and Pittsburg mines.

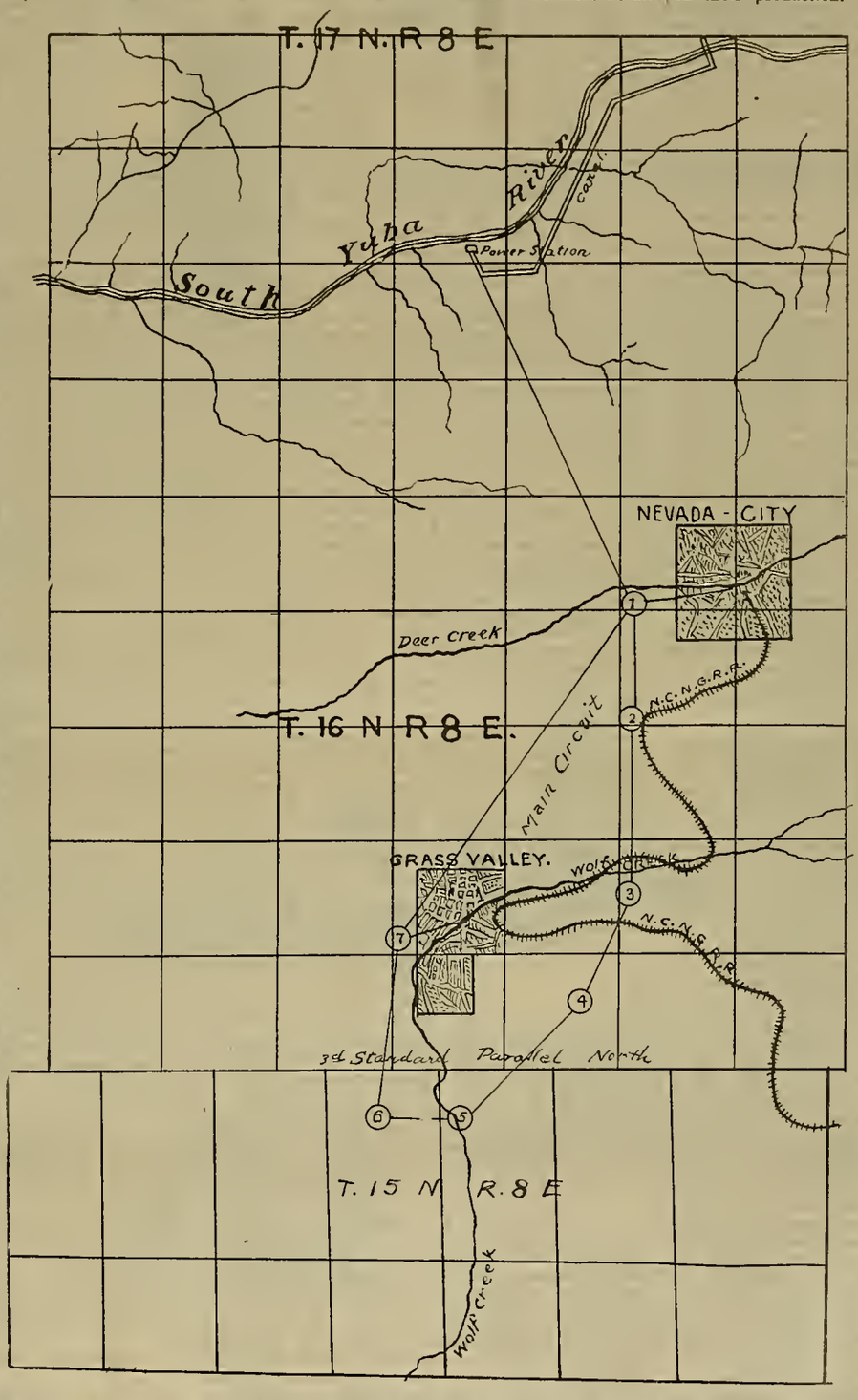
3. The Idaho, Maryland group of mines.

4. The Empire, W. Y. O. D. and Pennsylvania group. From this point power will be transmitted to Osborne Hill, Conlan, Lafayette, Centennial, Green Mountain and other mines, taking in all properties lying in a southeasterly direction from Grass Valley.

5. The Omaha and Lone Jack group. From this point power will be distributed southerly to the celebrated Allison Ranch mine, taking in the Illinois, Hartery and other mines.

6. The North Star mine; thence to:

7. The Peabody mine, taking in on its route the Rocky Bar, New York Hill, Hudson Bay, Tribute, Massachusetts Hill, Stockbridge, Scadden's Flat and Gold Hill. From 7 the line will pass through Grass Valley townsite and return to 1, thus completing the circuit. It will be seen that there is quite an extensive field for the consumption of power all within a compact circle of seven miles in diameter.



Three different electrical companies are competing for the contract to put in the entire electrical machinery and have each offered most favorable terms to the company. Several estimates have been submitted that are at present being examined by Prof. F. C. Hasson, the company's electrical engineer. The dam will be constructed as soon as the stage of the water in the river will permit. It is not the intention of the company to generate electricity except as it is contracted for. Contracts have already been made for 750-horse power.

The company will erect and maintain a number of electric arc lights, each of 2000-candle power, at a distance from each other not to exceed 500 feet apart, along the high-road between Grass Valley and Nevada City for the next five years, said lights to be burning all night without any expense to the county. This is almost entirely a Nevada county enterprise, and the president of the company is Alf. Tregidgo, who is also president of the Nevada County Miners' Association, the largest one of the kind in the State. When this electrical plant is completed it will be of great benefit to the many miners in need of cheap power for operating hoists, pumps, mills and other machinery.

A Department of Mechanics.

Some time ago, in discussing the friction that exists between the engineer and the officers of the navy, we stated that we thought there were some points in favor of the establishment of a department of mechanics under the government, which department should have charge of all mechanical work for the government.

The more we consider this matter and the more we discuss it with others whose opinions may be supposed to be worthy of consideration, the more fully are we convinced that such a department of the government would be very advantageous in many ways.

The time has now come when the manufacturing interests of this country are scarcely inferior in importance to any other, and we think that any one who will take the trouble to examine into the matter a little will find fully as many reasons for the existence of such a department as for the existence of such a department as that of the Interior, Agriculture, Post-office or most of the others.

Within this department we think that all mechanical work of whatever kind done by the government should be executed, instead of having it, as at present, scattered around among the departments, each one making or contracting for what it needs, whether it he naval vessels, cannons, small arms, coast survey instruments, astronomical instruments, or mail bags. It would not follow from this that all these various kinds of work should be done in one establishment, nor that all of this work should be actually done by the government, but the mechanical department should have supervision over all of it, and this department should be in charge of a chief officer and assistants qualified by nature, training and experience for the work they have to do.

For instance, we believe that the legitimate and only proper function of the Navy Department is to navigate and fight naval vessels, and that the making and repairing of naval vessels and their armaments might better be left to mechanics and engineers. By the same token we think that the proper business of the army is to carry on campaigns and fight battles, and that the making of shoulder guns, swords and cannons should be left to those who can make an exclusive specialty of such arts as are concerned in their production. We believe that the rank and title of Commodore for a mechanic and engineer is a meaningless anomaly, and the employment of an army Captain in making guns an absurdity. A man who attains distinction in mechanical science or engineering should have a title and honors which mean something within the field occupied by him, and which should net be complicated by the use of the same title by men occupying entirely different positions, involving duties as different as is night from day.

Not long since a Captain was appointed to a position, the duties of which are not, or at least should not be in the least military, but purely mechanical and executive. A published statement of his qualifications for the position was as follows:

"He was 17 years old when he entered the Naval Academy at Annapolis, and was graduated at the head of his class at the outbreak of the Civil War, so that he had an opportunity to see real service from the beginning of his career. In 1862 he was promoted to be Second Lieutenant. He served during the war in the Potomac flotilla, in the Gulf squadron, and in the monitor fleet at Charleston, S. C. He was one of the survivers of the "Patapsco" when she was blown up by a Confederate torpedo and lost two-thirds of her men. His services since the war comprise duty in the European squadron twice and some years in American waters, including a voyage on the 'Congress' to carry relief stores to the explorer, Hall, and the command of the 'San Francisco.' He has also been in charge of the torpedo station at Newport, of the Annapolis academy, and of the Washington Navy-yard. He is said to be a strict disciplinarian."

Now we should say that this record is highly creditable to the gentleman referred to. But is it not self-evident that a man having such a record should remain during the active years of his life in a service where the record would be of some use to him, and where it would be proof of fitness for the position occupied? while positions involving a knowledge of mechanical science should be filled by those who had made their record within the field of that science? The captain referred to is competent, no doubt, for the position to which he has been appointed, and is very possibly the best man that could have been selected for the place from among those who are eligible for it. But no mechanic, no matter what his attainments, was or is eligible, which seems to us to be an absurdity. All through the connection of the government with mechanical matters such absurdities are to be found. Mechanics and engineers as such must be subordinated to officers who, in the nature of things, must know far less of mechanical matters than is known by those who make a specialty of mechanical matters, and whose record and career are entirely dependent upon their knowledge of them. We believe this is decidedly unfair to mechanics. We believe that the development of naval vessels and of all kinds of fighting machines, large and small, is due mainly if not entirely to mechanics and engineers, and that they should have the credit of it. They can secure this probably only through the establishment of a department of mechanics, which should stand upon the same footing as the other departments of the government. Other advantages would probably result from the establishment of such a department which need not be mentioned at this time, but which will suggest themselves.—American Machinist.

A PRECIOUS CARPET.—Stock was taken at the United States Mint in this city last week preparatory to the retirement of General Dimond and the assuming of duties by Superintendent Daggett. The money in the vaults was

not counted, as the official seals on the doors which guard millions in gold and silver speak for themselves. The carpet in the coiners' department was burned, according to the usual custom every four years, and $4400 worth of the precious metal was obtained. This was cast into a bar and placed on the inventory as a part of the Mint's assets. Four years ago when General Dimond assumed the superintendency the carpets "panned out" about the same amount.

Pocket Mines.

TO THE EDITOR:—When gold was first discovered in California, and for several years following, placer mining was the only branch of the mining industry practiced or known to the thousands who labored with pick, shovel and pan to roh mother earth of her golden treasure; and, if any other branch of mining was known to a few of the great multitide of miners who rushed to the gold fields, they either forgot their knowledge of that branch or did not consider it worth bothering with, when gold could be obtained so easily in the placers as it was in those days. But, as the years rolled on and the best placers were worked out, many of the miners who had found quartz, rich in gold, in the gulches and ravines where they had worked, began to look for the gold in quartz. Their researches were rewarded, and that period marks the first step forward toward the development of the many rich quartz mines we have on this coast to-day.

Ever since that period when quartz mining first attracted the miners' attention on this coast, science has advanced with rapid strides in this industry, until to-day the Pacific coast, and California in particular, leads all other parts of the world in lmprovement and progress in this industry. The latest improved machinery and methods of working gold and silver ores are Pacific coast designs, and the MINING AND SCIENTIFIC PRESS has been the chief factor in bringing this stage of advancement about, by giving to the world, through its columns, a reliable and authentic account of all the different discoveries, processes, improved mechanical appliances, etc., which have been invented from time to time. The three different branches, viz., placer mining, quartz mining and pocket mining, are each an interesting study and a science, so to speak, within themselves. At the present time, pocket mining is attracting more attention among prospectors and those in quest of knowledge pertaining to mining than elther of the others, for the reason that it is new and has not yet reached the advanced stage which the other branches have; consequently there are more opportunities for the prospector to make new discoveries and realize a profit from such for a small outlay than there are in prospecting for placers or milling propositions in quartz. All the capital the average "pocket hunter" requlres is a pick, pan, shovel and gruhstake; for, if he is successful in finding a pocket, he generally gets all the gold in a short time without further expense.

Pockets occur under certain conditions in a certain class of formation, hence the term "pocket formation." This pocket formation extends along the mineral belt from Fresno county on the south, in California, to Douglass county, in Oregon, on the north, as far as it is known and pockets have been found. This pocket formation also occurs in places through Nevada, eastern Oregon, Idaho, Montana and Washington, and, in fact, in the most of the different sections where gold and silver are found, west of the Rocky mountains. Pocket formation invariably carries the following-named minerals hesides gold, and sometimes silver: Iron, copper, lime, sulphur, and, in many places, lead. As a general rule, the formation is a soft porphyry, or gray slate, which slacks and decomposes rapidly by exposure to the air and sun. Pockets vary in size in different localities according to conditions. But some people may ask the question, What is a pocket? So it would be well to explain what a pocket is before we proceed further. A pocket is a mass of valuahle mineral concentrated within a small space in a ledge, lead or vein; or, in other words, they are very rich spots in ledges, veins, seams, or feeders, while the rest of the ledge is either barren or very much lower-grade ore than those spots or bunches which are called pockets. While the majority of the pocket ledges are barren except where the pocket occurs, yet there are many milling propositions that carry a paying quantity of gold all through, that are pocket ledges. Pocket ledges generally cut or cross the formation, while in the same district the milling ledges run with the formation or course of the country rock. Throughout the coast mineral belt the course of the pocket ledges is nearer to an easterly and westerly direction, whlle the milliug ledges, on the contrary, run nearer to a northerly and southerly direction. This is more particularly noticeable in the northern districts, through southern Oregon and northern California, than it is in the other districts east and south. The chief minerals which predominate in the pocket formation through the first-named sections are iron and lime, and the formation itself is principally porphyry. The outer edge of this pocket helt ls so well defined in places that the experienced pocket-hunter can tell within a few feet of how far it extends. This statement may not be credited hy some of our skeptical mlning sharps, hut nevertheless it is a fact, for there are several places in Jackson and Josephioe counties, in southern Oregon, where small pockets ranging from $5 to $100 have been taken out on the bcrder, next to the granite and gneiss, and within 50 feet of those pockets—in granite and gneiss formations—small ledges or stringers, hearing gold tneir whole length, have been found. But all search so far has failed to discover a pocket or hunch on any of those stringers, while in the porphyry on the other side, a few feet from the contact of the gneiss and porphyry, or the granite and porphyry, the veins carry no gold except in pockets. The pocket helt through this section is very irregular in its width and course; in some places it extends several miles in width, while in other places it narrows up to less than a mile. The general course of the belt from Oregon across the Siskiyou range into California is almost in a southeasterly direction, crossing the Klamath river some elght or ten mlles west of Hornbrook and Cottonwood. There has only been a few milling ledges which have been worked to pay within the limits of this belt, and none of them carried the gold to the depth of 100 feet, while outside of the horder of this pocket belt, on the west side, we firmly believe that development of the ledges in time will prove that they become larger and richer as they go down.

In the series of articles to follow I will endeavor to illustrate, in plain language, the different theories of what causes gold to occur in pockets and what form them, and no particulars pertaining to pocket mining on the coast from Mexico to Alaska will he omitted.

ALEX. QUARTZ.

Asphalt Mines in Syria.

United States Vice-Consul Khouri, at Beirut, Syria, in a report to the State Department on the asphalt mines of that country, states that four asphalt mines are known to exist in Syria. One is situated in the vicinity of Hashaya, about 30 miles to the south of Beirut; the third is near Ain-Ettineh village, 70 miles to the east of Beirut; and the fourth is found in the valley of the Dead sea. Of these mines, the one at Hashaya is the most important, and the asphalt obtained from it is considered the best, with the exceptlon of that of the Dead sea, which floats in small quantities on the surface of the water and drifts ashore, where it is picked up hy the Bedouin Arahs.

Until 1860 these asphalt mines were almost entirely neglected; hut in 1864 the asphalt mine at Hashaya was leased hy the Turkish Govermnent to two native merchants—Messrs. Freige and Misk—for a term of four years at a rental of 80,000 piasters ($3520) per annum. The operations of this company did not prove very successfnl, lack of an adequate system of engineering greatly reducing its profits. In 1878 the mine was leased by the firm of Messrs. Tahet & Co. for four years at an annual rental of 250.000 piasters ($11,000). During these four years ahout 4,000,000 kilograms (4400 tons) of asphalt were extracted. At the expiration of the lease the mine was leased to another company, Absy & Co., for a term of ten years, commencing in 1888. The condition was that 65½ per cent of all the asphalt extracted should go to the agents of the imperial private treasury, the mine being the private property of the Sultan. During the last five years the amount of asphalt obtained by Messrs. Absy & Co. from the Hashaya mine is estimated to be 5400 tons. The company's success has been mainly due to skillful engineering and methods of excavation. No asphalt is at present extracted from the other mines in Syria, as the local Turkish authorities strictly prohibit their being worked.

When Messrs. Freige & Misk first worked the Hasbaya mine, the asphalt was sold in Europe at an average rate of $19.30 per 100 kilograms (220 pounds). Its present price in the foreign markets is hetween $8 69 and $9 65 per 100 kilograms. The Syrlan asphalt is subject to no tax except an export duty of one per cent. It is rumored, however, that a new rescript issued by the Sultan enjoins that no export dues should be hereafter imposed on that article. The exact quaotity of asphalt now in stock cannot he ascertained, as the parties who monopolize it decline to glve the figures. It is probable, however, that not less than 3000 tons are stored for sale by the agents of the imperial treasury and the mining company. The asphalt obtained from the Syrian mines is invariably exported to Europe and America in its natural state, without undergoing any process of preparation.

The following table shows the value of that exported from Beirut to the United States since 1882, when the first important shipments were made:

Year.	Value.	Year.	Value.
1882	$12,239 00	1890	$ 6,983 00
1883	11,576 99	1891	7,303 03
1884	6,095 00	1892	21,207 44
1885	3,176 30		
1889	1,958 17	Total	$70,588 93

During the years 1886, 1887 and 1888 none was exported from this consular district to the United States, owing to low prices in America and a scarcity in the supply for home consumption.

From statements made hy a number of reliable persons, it seems very prohable that asphalt exists in large quantities in all the mines which have been discovered, and that thousands of tons might be extracted every year if the local authorities would allow the mines to be worked.

An Old Timer.

The vicissitudes of life bring about many curious and interesting events. The peculiar conditions of early California life have been productive of many strange personal histories which are interesting if not instructive. Several of world's prominent millionaires got their start in Nevada county, and others mined here in early days and carried their blankets about from place to place in search of the fickle goddess of fortune. Many who were at different times millionaires are now compelled to work for the necessaries of life, having lost their fortunes in fruitless endeavors to find other and larger ones.

There is in Truckee a gentleman who went to Nevada City in 1850, and who for years was associated with the most prominent mining enterprises of that section. He opened several of the mines which in early days paid hig returns. He was able to draw his check for hundreds of thousands of dollars, and he started in life several men who have since become famous mining millionaires. He gave to John W. Mackay $164,000 for just writing his name. With this as a foundation, Mackay built that colossal fortune which enables him to live like a king and to call the world his home. Several smaller fortunes may he traced to this man's operations in Nevada county. There were various times when he might have left the mines with an independent fortune for himself, hut he had been seized hy the mining mania and invested again and again, only to find at last that the game had gone against him and that he was a comparatively poor man. He went to Virginia in the palmy days of the Comstock, hut the good things were all in the possession of men for whom he had paved the way. The remnant of his fortune went in stock speculations, and now he is contentedly working hy the day for a living, having philosophically accepted the reverses of fate.

This history might be repeated a thousand times, with only slight variations; and in nearly every case, as in this one, the individual will be found to he fondly clinging to some "prospect" somewhere, in the hope that before he dies he will yet have retrieved his place in the financial world. Vain delusion! and yet without it many a man would have nothing to live for. That hole in the ground is all that is left him of a long life of turmoil and struggle for gold. And, after all, is it not all they now need? Is it not what all of us shall come to sooner or later? The millionaire's money may not buy him a respite of a single minute. Of the houses and lands of which he may have called himself master, of the gold that jingles in his vaults, he can take none along. "Some six feet of sod" is all he will require, and then he and the pauper are again on an equality.—Truckee Republican.

The Great Diamond Mines at Kimberly.

Mr. James H. Balmer, of Kimberly, who is on a vislt to this country, gives some information regarding the diamond mines of south Africa and the methods of working them. The De Beers Consolidated Mining Company controls an output of diamonds which amount to $100,000,000 annually. Until a few years ago there were two diamond-mining corporations in south Africa, the De Beers and the Kimberley, hut the former bought the latter for $16,000,000, making payment with one certified bank check, and thus practically securing control of the world's diamond market. "The two mines now being worked by the De Beers Company," said Mr. Balmer, "cover an area of 36 square miles and reach a maximum depth of 1000 leet. Of course the market is entirely in Europe and America. Dynamite is employed in some places, hydraulic power in others, and the simple pick and axe in others. The labor in the pit is performed entirely hy male negroes, of whom 1000 are employed. They are in charge of white overseers, who also superintend the use of the dynamite. From the pit the rock is wheeled in barrows to a hydraulic elevator, whence it is carried to the drying fields above. These fields or levels are many miles in extent, and through all parts of them run moving endless chains to which the barrows are attached. These chains carry them, guided hy negroes, to all parts of the field. There the contents are spread flat upon the boards, and in a few day's time the intense heat of the sun relaxes the rock to a powder. From the wooden platforms it is carried to a washing-house, where the dust is placed in huge machines in which the dirt is washed away and the diamonds remain and gravitate to a common center, whence they are taken and packed for shipment to different parts of Europe.

"It is estimated that hundreds of thousands of dollars' worth of the diamonds are stolen every year hy the negroes, in spite of the extraordinary care taken to prevent theft and the penalties imposed for conviction of it. Every negro is made to sign a contract when he enters the employ of the company. It may be for three months or three years, but during all the period of his labor he is held a close prisoner. The entire mining property is inclosed by a harbed-wire fence of great height, and at each gate an armed sentry patrols his heat. Negroes are neither allowed in nor out under any circumstances, hut white men may come and go after obtalning permission. When the negro is about to leave the employ of the company, he is taken to a guard-house, where he is again imprisoned for several days. He is stripped naked and examined. They comb out his woolly hair, dig out his ears, his nose, and examine his mouth for hidden diamonds. They feel of his legs, his thighs, his arms, every part of his hody, and whenever a lump is discovered a knife is dexterously inserted and the lump is usually found to he a diamond. But—and now comes the climax—they get at the contents of his stomach hy the administration of powerful physics and emetics, for the kaffir will go to any extreme that he may steal the precious stones.

"There is a class of men in south Africa known as I. D. B.'s—illicit diamond-huyers—who make it their husiness to buy stolen diamonds from the negroes. It is a great risk they run. If a detectlve sees a man walking the streets of Kimberly, whom he merely suspects of having a diamond in his possession, he may cause his arrest. If a diamond is found on his person and he fails to give a satisfactory proof of his right to it, he is tried, and, if convicted, sentenced to five years' penal servitude and a fine of $5000.

"The Dutch were once the supreme rulers over south Africa, but they are rapidly giving way to the English. Even in the Dutch Reformed Church their language is heing replaced hy the English tongue."

Assessment Work while Mines are Idle.

TO THE EDITOR:—Io view of the present condition of the silver market, and its hearing on silver mining interests, will it not be well for all those haviog silver mining interests to meet and discuss measures for procuring relief as to the quantity of work to be done, or cost thereof for assessment work as now required by law, to legally hold mines, claims or locations? With all work stopped; with some expenses and no income, the enforced expenditure of $100 for assessment work on each claim, mlght well be modified until hetter times obtain. The hurden falls heavily on those least able to hear it.

I. B. BAINBRIDGE.

Pasadena, Cal., June 28, 1893.

A WATER SCHEME.—M. C. Taylor, a resident of Grass Valley, has forwarded a communication to the Board of Supervisors in which he suggests a new plan for San Francisco to supply herself with the water needed by her citizens. Hls idea is that the city should file a right to water at the forks of the middle and north Yuha rivers, a point about 140 miles distant. Water could he brought from that point, where an electric plant could also he established.

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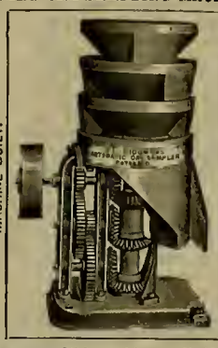

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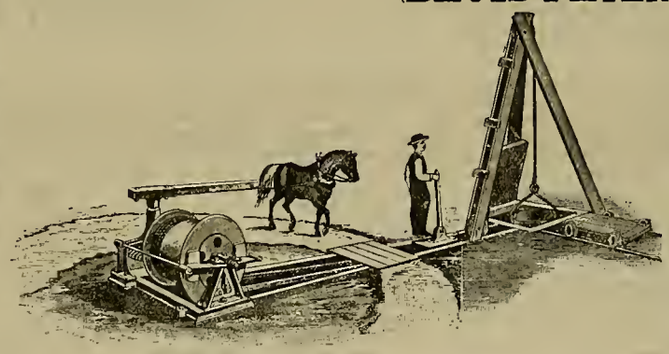

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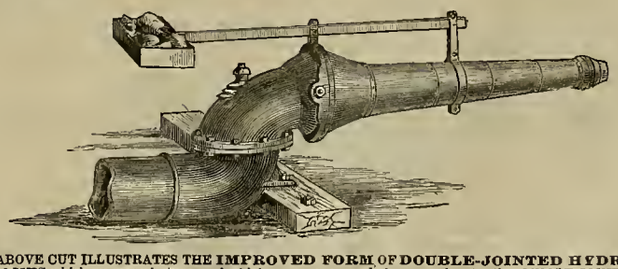

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Mechanical Progress.

Speed in Steamship Travel.

Perhaps the most practical article on the possibilities of speed yet published is one contained in the current number of the *North American Review*. The writer is Prof. J. H. Biles, of Glasgow University, who, as the designer of the successful ocean greyhounds, New York and Paris, is well qualified to present a sound opinion in the matter. At any rate, he does so in no uncertain manner as regards the mechanical difficulties which lie in the way of the attainment of greater speed, and his conclusions are well worth consideration. Looking back on the progress which has marked transatlantic navigation during the last decade, we find that the best time of transit from New York to Liverpool has during that period been reduced from about eight days to a little over six days. The question naturally comes up: Will this ration of increase in speed be maintained in the next ten years, and if so by what means will its accomplishment be attained? Mr. Biles is broadly of the opinion that an equal advance in the speed of transatlantic vessels will be witnessed during the coming decade. That is, that the time of passage will by then be reduced to a little over four days, necessitating a speed of 30 knots an hour, and he shows in detail how the extra knots are to be obtained.

Briefly, his conclusions are as follows: To attain a maximum of speed, the cargo-carrying feature will have to be reduced or eliminated in the swift mail and passenger carriers, the space thus gained being devoted to additional motive power and the cargo relegated to slower vessels. This, he calculates, would give an additional 1½ knots an hour. The use of nickel steel in construction in place of ordinary steel is another feature which will add a further knot an hour. Up to the present, considerations of expense have prevented the use of this material, which is from 40 to 50 per cent stronger than the steel now used, but the cost of it will surely decrease as years go by, in the same manner as did that of its predecessor, and the ocean racers of the future will be made of nickel steel. The adoption of lighter boilers, of locomotive or other type, and the use of oil or other light fuel in place of coal, with improved methods of combustion and of utilizing heat, will also be details of improvement which may be expected in the evolution of the next ten years. Increase in structural dimensions, too, will tend to the same end, length and draft of water being valuable additions which can be made with a view of increasing speed, it having been proved that by increasing the length of some forms of vessels more velocity may be got out of them with the same amount of motive power. In fine, our authority concludes that a vessel 1000 feet long, 100 feet wide, with a draft of water of 30 feet, with a structure built of stronger steel than at present adopted, with lightened boilers, with oil or other light fuel, and with the steady general improvements in methods of construction and management of ships and machinery, will be capable of crossing the Atlantic at a speed of 30 knots an hour, thus accomplishing the passage in a little over four days. In the designing of such a vessel, although many problems of constructural detail will be involved, there is no insuperable difficulty. In the commercial aspect of such a departure it will, however, be more or less of an experiment at first.

Gas Motors in Germany.

In a recent address before the Prussian Association for the Promotion of Industry, Herr W. Oechelhauser stated that the distribution of power, or rather of fuel, from gas works, has not made as much progress as it should have done. The practice goes as far back as 25 years ago. There seems to have been, two years ago, about 18,000 gas motors in Germany, with an aggregate horse power of about 60,000. To these are to be added the turnout during the last two years, amounting for the two greatest manufactories alone to 1950 motors, of 8830 horse power. At the beginning of 1892 there were in Prussia alone 69,087 steam horse power occupied in driving dynamos. It must, at the time, be remembered that it is only recently that gas has been cheap enough to enable gas motors to be pushed. The state of the gas motor industry is a thing for Germany to be proud of. The Lenoir machine of 1861 used 123 5 cubic feet per horse power per hour; the present motors use 28, or in large sizes 23 75; so that a 16-candle incandescent lamp can now be kept going at an expense of 21.2 cubic feet of gas. And this consumption is not the consumption at full load, as it is usually reckoned for steam engines and electromotors, but the average consumption for all loads; and it may be expected to be reduced very soon, with motors of 500 horse power, to 17.6 cubic feet of 16-candle gas per horse power per hour.

Phillips' Aerial Machine.

The London *Times* gives the following description of the new aerial machine of Horatio Phillips, with which some successful experiments have been made recently near Harrow. The machine is on an entirely new principle, being sustained in its flight by means of induced currents acting upon slats or laths of wood arranged similarly to those of a Venetian blind, instead of the unwieldy plane to which designers of flying machines have usually had recourse. Not but what Mr. Phillips has used inclined planes, but he has reduced their dimensions, step by step, until the transverse sectional area of one of his present sustainers measures only an inch and a half in breadth by an eighth of an inch in thickness at the front, tapering to nothing at the back. Broadly stated, the cross-section of the slat is that of a knife blade, with a thick edge at back and a thin one at front, and with the upper and under side of the slat curved, but both differently. The form, in fact, is such that when the machine is in motion the convex upper surface near the front or thick edge deflects the air upwards, thus creating a partial vacuum on the upper surface of the slat.

The under or concave surface of the slat is formed to a parabolic curve, which gradually puts the particles of air into motion downwards, thus producing an excess of pressure on the under side of the slat. It thus follows that upon a forward motion being given to the machine, the horizontal air-pressure which is brought upon the slats becomes converted, by reason of the form of the slats, into an upward vertical pressure which acts as a lifting power and raises the machine into the air. There are 50 of these sustainers or slats, each 1½ inches wide and 22 feet long. They are fitted 2 inches apart and with their edges horizontal, in a frame 22 feet wide and 9 feet 6 inches high. They have a combined area of lifting surface of 136 square feet, and they are carried in their frame upon a carriage resembling a canoe, 25 feet long and 1 foot 6 inches wide at the rear, but tapering to a point at the front.

Upon the carriage and near the sustainers are placed the engine and boiler and the air-propeller. The engine is compound, having cylinders 1¾ inches and 3⅝ inches in diameter, respectively, with a 6 inch stroke, and fitted with ordinary slide valves. The boiler is a cylindrical vessel of phosphor bronze, 12 inches in diameter and 16 inches long. The propeller is two-bladed, 6 feet in diameter and of 8 feet pitch, and is driven at the rate of about 400 revolutions per minute. The total weight of the machine in working order is 330 pounds.

INSULATING WIRE BY PAPER.—While electricians have been searching high and low for a perfect insulating medium, especially for high-tension currents, an everyday material has been utilized for this purpose in a very practical and effective manner. For a long time the value of insulation composed of spirally-wound and overlapping strings of pure vegetable-fiber paper has been recognized, and many patents have been taken out, having in view its more efficient application, but only recently has the paper-insulating industry attained dimensions which entitle it to a prominent place in the electrical field. The paper, which is specially made, is thoroughly cured before being used. The rolls are mounted on machines and are cut into strips by circular shears, which leave the paper resembling "ticker tape." The spools of paper are then placed on mandrels in the covering machines, and as the wire feeds through the paper is laid on in overlapping spirals at the rate of from 60 to 500 revolutions of the mechanism per minute. The wire is then passed through dies, which materially increase the tightness and compactness of the insulation. The next step is the winding of the wire on iron reels, which are placed in drying ovens that have a temperature of 250° Fahrenheit. This expels all moisture, and the wire is suddenly plunged in a special secret compound, and for some time subjected to a stewing process at a temperature of about 275°. The wires in due course go from the tanks to the braiding or leading department, where they are finished. Although paper-insulated wire is used largely in telephone work, it has been found very effective and reliable with high potential currents, even up to 10,000 volts.

Scientific Progress.

The Relation of Photography to Art.

M. Robert de la Sizeranon has an excellent article on the subject, "Relation of Photography to Art" in the *Revue des Deux Mondes*, translated into *The Review of Reviews*. He dwells, first, on the service photography has rendered to painters in enabling them to study correctness of detail. The conventional landscapes, the complicated architectural backgrounds, the "ideal" and impossible forms of men and horses, have all disappeared. The whole art of "historic landscape" has been relegated to the Valley of Lost Lumber. In perspective, photography has made it possible for us to appreciate more accurately the size of figures in different planes. Most painters before the rise of photography will be found to have given too much importance to the figures of their background or middle distances, relatively to those of the foreground—a mistake frequently made by amateurs in landscapes. Photography has also simplified, to an astonishing degree, the production of panoramas. After noting the influence of photographs of distant countries in interfering with the production of fancy tropical landscapes and imaginary eastern scenes, and the revolution it has brought about in the art of portraiture, M. de la Sizeranon goes on to discuss what may be expected of photography in the future. He devotes several pages to the discussion of Muybridge's instantaneous photographs of horses and other animals in rapid motion, and inquires whether we are to accept the often extremely ugly and awkward poses shown in them as nearer reality than what the ordinary eye supposes itself to see. He thinks not—rather that the modern picture is a violent exaggeration; for it presents to us, immovably fixed, a position in which the animal only remained for so incalculably minute a fraction of a second that to the eye it blended with the position immediately following it, and so formed part of a harmonious motion. Every movement consists of a succession of poses, each lasting so infinitesimally short a time that we see none of them separately. What we do see (when the motion is not too quick to let us see anything distinctly) is a generalized representation of the whole, a kind of composite photograph, so to speak; and an approximate picture of this is nearer the truth than any number of instantaneous photographs of separate poses. It is, however, a distinct gain that the classic charger at full gallop, with all four legs extended in the air at once, who never existed on earth save in battle pictures, should finally have been hunted and driven from the field, as Mr. Muybridge has had some share in doing.

Photography is growing more perfect every day; even the great color problem seems to be as good as solved at last. M. Lippman has succeeded in producing several very successful photographs in colors, by availing himself of the laws of interference of light. Last spring, at the International Exhibition of Photography at Paris, he exhibited a picture of an Ara Parrot (blue and yellow), and a branch of holly; at a later date he succeeded in producing a stained-glass window in four colors, a group of flags, a plate of oranges with a red poppy, thus almost completing the chromatic scale. He uses a mirror, a film of gelatino-bromure, and a little mercury.

It may be said that, since this last step has been taken, photography leaves nothing for the painter to do. If it were true that the only object of art is the mathematically accurate reproduction of the world around us, this argument would be unanswerable, and the "realist" school, who maintain this position, are beginning to find that they have no *raison d'etre* whatever. There remains, then, nothing for artists to do but turn their attention to those (of late somewhat neglected) regions which the camera cannot reach; and we may consequently expect a new development of imagination and idealistic art.

How Straw Paper Is Made.

A recent visit of a newspaper man to the straw-paper mill at Chillicothe, Ill., results in the following description of how the paper is made, and as the method is very similar to that of making strawboard, the article will be interesting.

Through the courtesy of Mr. James Waterhouse, we started at the straw pile and were conducted through the various processes to where the finished paper lay bundled for the market. The straw is conveyed on a long carrier from the straw pile to the cutter, which is run by a 25-horse power engine, and cut into small particles, then elevated to the upper story and dropped into two digesters, where it is cooked by the lime process.

These digesters are large iron tubs 24 feet long, 8 feet in diameter, and weigh 80 tons; it requires a carload of lime every week. The hot liquor cooks the straw to a pulp, after which it passes through pipes to a chest on the lower floor and is then pumped through an eight-inch pipe to the washing engine on the upper floor, then back down below to the half-finishing chest, whence it is again pumped up to the upper floor and passes through the coase grinder and finishing engine, thence to the vat near the rollers, where the liquid is separated from the stock, which is gathered by a fine wire roller and adheres to the felt rollers, where it begins to assume shape. It then passes over a series of rollers at the rate of 96 to 120 feet per minute. It is then carried over 13 large drying rollers that are heated by steam, thence to two stacks of calenders of chilled steel, where the paper is finished and transferred to the reel stand and then passed to the cutter, where it is cut to any required size. It is then received by two boys, who carry it to the table where it is bundled, and the straw pile that you stood by six hours ago lies before you, finished goods all ready for the market.

The paper is manufactured by the Tompkins process. The mill is supplied with the latest improved machinery for making brown straw and colored express paper.

Some idea may be formed of the magnitude of this plant when you realize that the ponderous machinery for its operation weighs 1000 tons, and requires three engines of 140-horse power to operate it, and three immense boilers to generate the steam, and still the power is insufficient. The company will place another engine of 100-horse power in the near future. The steam pump in the valley below the mill raises 500 gallons of water per minute.—Sbears.

WARM AND COLD GLASSES.—This matter of conductivity brings up that of the feeling of coolness to the touch, of different substances which are at a temperature below the temperature of the human body. Most of our readers will be aware that a glass spectacle lens feels colder to the touch than does one of horn or celluloid at precisely the same temperature. This is, of course, due to the greater conductivity of the glass. It does not necessarily indicate any advantage in respect of the absorption of radiant heat. Thus, to give a somewhat extreme illustration: It is well known that ice, which is a better conductor than is glass, can be successfully employed for the construction of lenses to concentrate radiant heat. Indeed, one of our observations shows that bad conductivity is to be desired in any screen intended to filter heat rays from the eyes. The conductivity of horn being .0001 in C. G. S. units, that of glass is about .0005. The conductivity of quartz, perpendicular to the axis, is, according to Prof. Forbes, as high as .0042, which may, perhaps, account for the "marvellous cooling properties" of certain lenses. On the other hand, in the direction of the axis, the conductivity of quartz is stated to be only .001. Is it possible to discriminate between pebble lenses cut in the two directions by the sense of touch alone?—Optician.

STONE UNDER THE MICROSCOPE.—It is often held that the best method of determining the probable durability of a building stone is to study its surface, or thin, transparent slices, under a microscope. This method of study in recent years has been most fruitful in developing interesting and valuable knowledge of a scientific and truly practical character. An examination of a section by means of the microscope will show not merely the various substances which compose it, but also the method according to which they are arranged, and by which they are attached to one another. For example, pyrites is considered to be the enemy of the quarryman and constructor, since it decomposes with ease and stains and discolors the rock. Pyrites in sharp, well-defined crystals sometimes decomposes with great difficulty. If a crystal or grain of pyrites is embedded in soft, porous, light-colored sandstones, its presence will certainly soon demonstrate itself by the black spot which will form about it in the porous stone, and will permanently disfigure and mar its beauty. If the same grain of pyrites is situated in or near very hard, compact, non-absorbent stone, the constituent minerals of which are not rifted or cracked, this grain of pyrites may decompose and the products be washed away, leaving the stone untarnished.—Stone.

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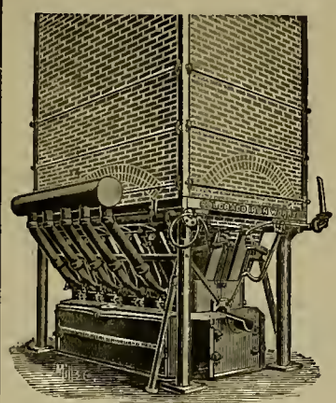
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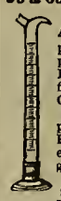
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Electricity.

The Trolley on the Erie Canal.

Within the next few weeks some experiments will be made hy Mr. Hannan, State Superintendent of Public Works, with the view of testing the feasihility of operating the Erie canal hy electricity, in accordance with the recommendation of Governor Flower. The trolley system is to be tried, and $10,000 are availahle for the experiment. According to investigations made, $1,000,000 would equip the canal and provide for 12 power-houses 30 miles apart. There is abundant water-power along the route for generating electricity. The total expense to each boatman for a dynamo would be from $150 to $200.

It is claimed by Governor Flower that it now costs the boatmen on an average $2 per day for horse-power, while it is estimated that the trolley system of towage would only cost 60 cents per day, aud that this would make so much difference that at two cents per bushel for grain carried the boatmen could make money. The present charge is 4¾ to 5 cents per hushel. The maintenance of the towing-path now costs about $400,000 per annum, and this sum wonld be saved if the trolley were adopted.

The members of the Union for the Improvement of Canals are not enthusiastic over Governor Flower's plan. They say it will cost much more than $1,000,000 to equip the canal, and that the figured cost of 60 cents per day to the hoatmen is much too low. Others say that the true solution of the problem is to deepen the canal to nine feet and then use a steam towage system, with an increased speed per hour of from five to six miles. The trolley presupposes a screw propeller on the boat operated by transmitted power, and many believe that the present section of the canal does not furnish water enough for this use of the screw. The overhead cable system is more favored by some, as providing a dead pull, without the slip and waste of power incident to screw propulsion.

Mr. Horatio Seymour, ex-State Engineer, says that the true solution of better canal service is to deepen the canal to nine feet at least, for no vessel can he propelled with economy in a shallow channel. He believes that this depth could he secured for about $1,000,000 over the whole canal, and that the carrying capacity of eacb boat would be increased by 50 tons by one foot more of draft thus secured.—Engineering News.

Failure of Motors in Shops.

Prof. Forbes, at the Electrical Convention neld in St. Louis lately, said:

You can hardly go into the workshops of any manufacturer of any country, where there is originality of design, where the man at the head is a great thinker as well as a good mechanician—you can hardly enter the shops without seeing some motor work upon an alternating cnrrent of a single phase. I bave seen at least a dozen classes of such motors, all working fairly well, but there are none of them heing put, at the present time, largely on the market. I am speaking now of motors which will start from rest with a good powerful twist, and which will keep up their speed and work economically. Of that type of motors I say I have seen a dozen different kinds in different workshops, bnt none of them largely used. I regret that I cannot make invidious comparisons between different systems just at the present moment.

In reply, President Ayer said:

Prof. Forbes has given us his observations to the effect that many shops have in operation various types of motors of small horse-power operating fairly well, doing some work and indicative of great promise, and when the heads of the concern are consulted and attention is called to these motors they do not like to admit that they are failures. Certainly the evidence is that manufacturers and representative men have concluded that there is little to he gained from them. Tbis is a disappointment to many of us. We have been anxiously awaiting this motor, and it is hard to give it up; but witb the experience of the past, and in view of the opinions we have heard expressed here, I do not think that any of us will lay plans for utilizing motors of this character in the near future. In speaking of the application or the prohability of the early development of a motor for use on our present lines, I referred to the apparatus we have in service—the high-frequency apparatus which is used in this country, 16,000 alternations per minute.

CONDUIT SYSTEM.—A new conduit system of electric traction, was recently tested on a short experimental track at Coney Island with very good success, it is stated. As near as can he determined from tbe newspaper reports the system consists of a conduit provided with so-called contact hoxes at short intervals. In the contact hoxes the cahle is bare, hut elsewhere it is covered witb lead pipe insulation. Up to the hottom of tbe cahle the contact hox is filled with solid paraffine, and tbe remainder of the hox is filled with high-grade paraffine oil. At tbe top of the box projects an arm fastened to a rod, at the lower end of which is a copper hrush for making a contact with the cable pieces. The position of the contact arm is so controlled hy a stout spring that when no car is passing the brush is in its normal position and no current is passing either to the ground or the rail, or in any way involving leakage or endangering life. The peculiarity of the arm is that it is constructed on the plan of the telescope, so that a car may hack and get tbe current without any strain heing brought on the box or the cable. The shoe by which the current is taken into the car, instead of being a short device, similar to the cahle grip, is made nearly the length of the car, being 9 ft. 2 in. long. It is constructed flexihly, in such a manner as to enable the car to take any curve, however sharp, and still preserve absolnte contact with the hoxes.—Engineering News.

A Remarkable Railway.

If the scheme elaborated by an Italian engineer for the construction of an elevated railway in Naples is carried into execution, Italy will possess one of tbe most remarkable structures in the world. As far as length is concerned, the projected line is not of great importance, but the boldness of the idea and its originality are very striking. Let the imagination conceive the hilly portion of a town connected by means of viaducts and towers with that part lying at a low level, and tbe suhstance of Mr. A. Avena's project will then be readily understood. The handsome and populous part of Naples, radiating from Via Roma, bas only communication with the Corso Vittorio Emmanuele, the San Martino hill and the (at a still higher level) new Rione del Vomero by means of narrow, tortnous streets, many of them being impracticable for carriage traffic. It is hetween these two extreme localities that the proposed electric railway is to form a connection. The line is to be carried on two metallic viaducts, each divided so as to form a douhle way, one for the operation of electric cars and the other for pedestrians. A masonry tower, 325 feet high, is to he built in the Via Roma, and from this the first viaduct, 1180 feet long, will he carried to the Corso Vittorio Emmanuele, where it will terminate in the base of a metallic tower, 490 feet in height. The second viaduct, 950 feet long and branching out of this tower some distance helow the summit, will pass over the San Martino hill and end in the ground level at the new Rione del Vomero. The viaducts will he carried on pyramidical metallic towers having masonry foundations, and the masonry tower at the heginning of the first viaduct and the metallic tower connecting the two viaducts will eacb be provided with staircases and capacious lifts for conveying passengers up and down. Passengers entering the cars at either end of tbe line will not be compelled to change their seats on arriving at the metallic tower, as the cars will be automatically placed on the lifts for ascending to or descending from the highest viaduct, when the cars will continue their way to either terminns. Generating stations will be provided at each terminus for producing current for lighting and power purposes. The undertaking, a concession for which has been granted, would provide a splendid view of the wbole of Naples.—Electrical Review.

Electric Traction.

The development of electric traction is now proceeding at a greater rate than ever before, and is still gaining in acceleration. "Networks" are being everywhere and almost daily projected, the greatest development in this respect heing in northern Obio, eastern Pennsylvania and northern New Jersey, where, if all the schemes that bave advanced as far as incorporation are carried out, the agricultural population in the network area will have almost urban transportation facilities. Of long-distance lines, the great Chicago & St. Louis line, seems to assure the final success of this remarkable enterprise. In Pennsylvania and Ohio there are several lines of over a hundred miles in length tbat are expected soon to he started, and each week tbe projects appear to become bolder.

As to street railways, it has been impossible for the large companies, even with their facilities increased to the utmost, to anywhere nearly equal the enormous demand for the necessary electric apparatus, and their orders are now stated to he months hehind and daily hecoming more in arrears. As to the final extent to which electric traction will he adopted for long distances, it is interesting to note that in the history of steam roads the first lines were sbort, and that it was tbrough the gradual connection of these that various lengthy systems were built up. As a consequence, the less ambitious lines of to-day may prove to he links in future great systems that will he gradually and therefore profitahly developed, and wbich are indirectly heing fostered hy the development of the smaller inter-urban lines.—Electric World.

Useful Information.

Petroleum Fuel in the Marine Service.

An interesting report on the use of petroleum refuse in the Italian navy has heen made by Admiral Sambuy of the Italian navy, an officer who has had charge of all the latest experiments with the petroleum fuel.

The experiments have been most exhaustive and satisfactory. The Admiral is firmly convinced of the great advantages of employing such a combustible as an auxiliary fuel in ships and a sole fuel in torpedo boats. He is particularly enthusiastic concerning it for the torpedo boats on account of the many conveniences concerning its use, and notably for the following reasons: Great heating power, ease of management, preservation of tubes and boilers, suppression of smoke, convenience of stowage, increased speed, increased radius of action, decrease of engineer's force, ease of removing combustible supply, both at sea and in port, perfect command of steam pressure, better stability with fuel stowed in the hottom of boat, and absence of dust and dirt in tubes and boilers.

The unsatisfactory results arising from the danger of ignition described by the French experiments are explained by the fact that the French employed the method of a certain Genoese named Ferrari, and with this method refined petroleum was employed. In Italy, with Cunibetri's system of using petroleum refuse, there is no danger of ignition at any temperature below 300° Centigrade, as trials have shown that it could not he set fire to by exploding shells. The Admiral is of the opinion that if the practical experience of employing torpedo boats fitted for petroleum with the permanent squadron proves to be a success, all their new boats should be designed for tbe sole use of this fuel, and should be fitted to carry it in bottom tanks below the water line, when there would be less danger from shot and bullet holes.

Some interesting trials of this combustible may be expected this summer, as Engineer Cunihetri, who is at present at Naples fitting his apparatus to the Confiensa and Montehello, has been ordered as chief engineer on the staff of the Duke of Genoa, who takes command of the permanent squadron on the Lepanto, a vessel already fitted for a petroleum refuse hurning and supply ship. There will be attached to the squadron three torpedo hoats, fitted for using the petroleum refuse. The present Minister of Marine takes an interest in the matter, and is disposed to extend its nse.

American Tools.

The manufacture of tools in the United States bids fair to surpass that of all other countries, including even England. The American implement is ligbter, bandier, and is usually made of hetter material than has been hitherto employed in Europe. The Americans have excellent iron and unequalled wood. (Hickory hammer handles!) The American tool manufacturers appear to have entirely abandoned European traditions, and to bave struck out an entirely new path for themselves; hammers, augers, files, sharpening and cutting tools, axes, saws, spades, screws, nails, etc., even the handles of implements, appear to have received quite new forms. In the same way tbe genius of the American, extremely careful to save all unnecessary lahor, uses cast iron far more tban it is employed in Europe. A great many machines and parts of tools that we make of wrought iron are there ohtained in excellent quality by casting. This has the important advantage that if a part of a machine is hroken or worn another exactly similar can be procured by sending to the factory its catalogue numher.

The American always endeavors, as far as possihle, to economize lahor. The blacksmith gets along without the man whom we consider absolutely necessary to hold the horse's leg. There is contained in every American an inventor, a mechanic or an architect. It is marvellous with what simple means they can succeed. As an example of the practical common sense of the Americans, we may instance the following: The masnn, who with us considers the cutting hammer an indispensahle implement, does not regard it a separate tool in America; there the trowel is made of hardened steel, and so shaped that it is used to cut and hreak bricks in brick-laying. When one thinks of the time tbat is lost in changing tools during the construction of a small house, he can see that this makes an important economy. The woodman, for another example, uses the axe far more than the saw, notwithstanding the danger whicb it involves. The Americans are as extravagant with materials as they are economical with labor, and for this reason the repairing of tools and implements plays a less imnortant role than with us.—Frankfurter Zeitung.

The Ancient and the Modern Gun.

An engineer, after visiting the caravel "Santa Maria," remarked that tbe little guns of that vessel were silent witnesses as to the limited advance in the science of ordnance, but bore potent testimony of the advance in the mechanic art. "Here," said the engineer, "is a huilt-up, breech-loading gun; it has a central tuhe, on which jackets are shrunk (or forced) in short sections; at the joints hetween these sections there are other iron bands, tightly shrunk. The hreech block, which is chambered, contains the cartridge; it is held in place hy a key, or wedge. This gun is certified to he a *jac simile* of those actually used by Columbus on board the 'Santa Maria.'

"The difference hetween this gun and those now heing built, and about wbich we read such interesting accounts, differs in magnitude, not in principle. The molecular strain in a forging or casting of great size led to the abandonment of cast guns and the adoption of huilt-up guns in our own generation; it seems evident that as the cupolas advanced in size and the molders' art progressed, the cast guns of large size became practicable; but with the increased internal pressures demanded the castings reached their limit, and built-up guns became essential.

"The gun of to-day is composed of a central tuhe, on which are shrunk 'hoops' in shorter sections; its hreech hlock is held in place by a slotted screw, which is but another form of the wedge, being a circular inclined plane.

"Tbe difference between the guns of Columbus' ships and those of to-day is due almost exclusively to the mechanic arts; to the steam engine as the power; furnaces, the cupolas, the hammers and the lathes as the tools, and to tbe brawny sons of toil who work these machines; the advance has been gradual, and is wrought by mechanics and draftsmen, and the claim that gunnery or that ordnance helongs to the occult science pales before the scrutiny of common-sense observation."

What Is a Corliss Engine?

One not versed in matters pertaining to the steam engine, and ignorant of just what constitutes a Corliss engine, might have considerable difficulty in these days to determine just what a Corliss engine is or was. The distinctive features of this engine, as built by its originator, were in the form of bed; in having two steam valves at either end of the cylinder on top, and two exhaust valves at either end below, in its round or cylindrical valves, with their oscillating motion; in its wrist-plate motion for actuating these valves, and finally in the detaching device for enabling the governor to control tbe point of cut-off. Our ignornant visitor to tbe exhihition at Chicago who should go ahout the power plant tbere, might conclude, not only that any one of these features might he dispensed with, and the engine still be a Corliss, hut that nearly all of them could be discarded, and still the name would apply. There are Corliss engines there that bave not the Corliss form of bedplate; and still others that have no wrist-plate motion. Usage seems almost to have justified the application of the name Corliss to any engine which bas four valves and an automatic variable cut-off.

The circumstance is certainly a great trihute to the genius of George H. Corliss—a trihute which no one interested in him or his fame can in the least object to; but it is questionable if there is the commercial advantage in it for some of those who pay the tribute that they think there is. Chas. H. Brown's engine is certainly as mucb a Corliss as some of those "hyphenated Corliss"

engines which, however excellent they may he as engines, resemhle the Corliss scarcely at all. It is extremely doubtful if he would have sold more engines lf he had called his engine the Brown-Corliss.

Where an engine has some of the features now considered essential to good practice, and is large enough to make the contract for building it amount to something, its selection depends usually upon the judgment of a man who knows what there is about it that is the invention of Corliss, and what is not. And he also knows what features are superior or inferior to the Corliss, and his choice will not he much, if any, affected hy the name which the machine may hear.

There is not offered as a criticism of those who choose to apply the name Corliss to their engines, for we helieve it ls perfectly right for them to use the name if they think the engine emhodies Corliss features, and should properly be classed as Corliss. We are only calling attention to what is growing to he a somewhat curions feature of the engine husiness.

Ethically it is certainly much superior to the course of those who, adopting the features originaed hy others, carefully avoid giving any credit for them whatever, either in the naming of the machine, or in any other way.—American Machinist.

IN the exact center of the Mines and Mining huilding at the World's Fair is a tall needle of anthracite coal from the mammoth vein of Pennsylvania. It is part of the State exhibit. Fifty-four feet high it stands and in the mass are 95 tons. The foundation goes through the floor. The mass is 10 feet sqnare. The cap was put on and the needle completed last week. It cost $10,000 to get up the pyramid. The hottom layer is from the hottom of the coal vein, the second layer is from the second layer in the coal vein, and so on to the top. There are six carloads of it in all.

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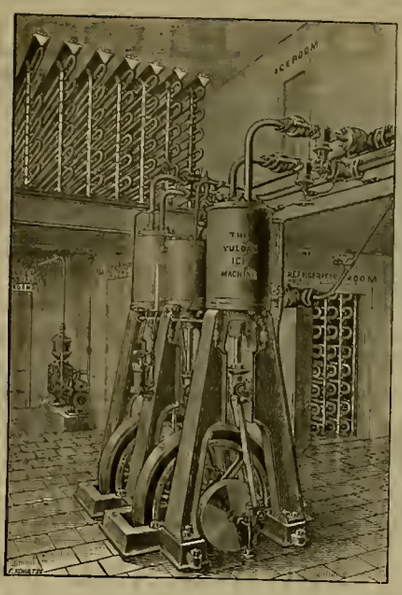

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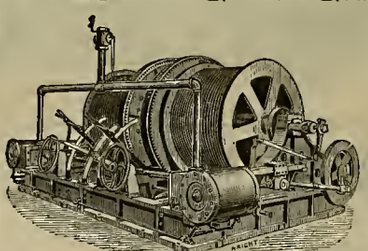

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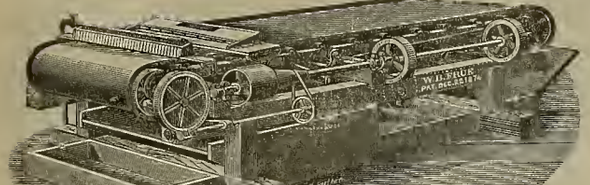

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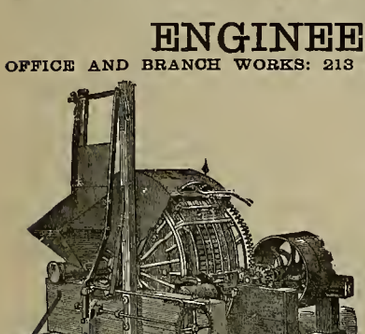

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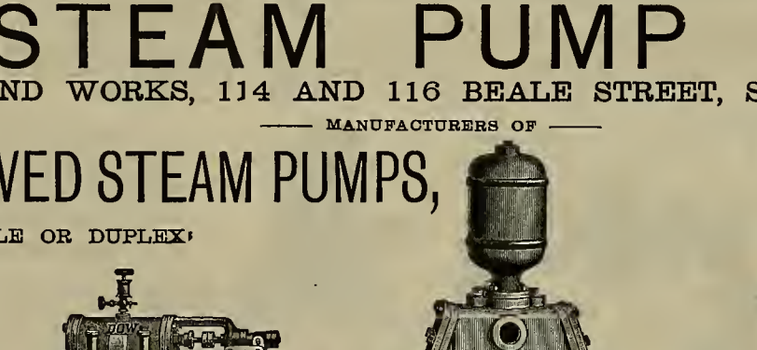

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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned

CALIFORNIA.

Butte.

THE GOLDEN QUEEN.—Oroville *Mercury*, June 29: C. J. Nickerson, one of the owners of the Golden Queen quartz mine at Forbestown, arrived in Oroville last night, accompanied by Geo. C. Hunter, the former superintendent. The gentlemen proceed to Forbestown this morning and will at once begin preparing the mill and mine to commence operations about July 15th. This mine, owing to difficulties among the owners, has laid idle for the past two years, although at the time it was closed down it was paying handsomely. They have one of the best ten-stamp mills in the county, which has been kept in good repair and it will require but little work to prepare it for operations. Geo. C. Hunter will, as before, be superintendent, and Arthur Peterson will have charge of the mill. There are now at the depot several carloads of material awaiting shipment to the mine. When the Golden Queen shall have resumed and the Shakespeare has its 30-stamp mill going, which will be about the same time, Forbestown will have three mills with 80 stamps crushing ore day and night, besides the biggest reduction works in northern California.

A VALY RICH MINE.—Oroville *Mercury*, July 3: Thomas R Jones, the well-known mining man of Gravel Range, was in town to-day, and paid the *Mercury* a visit. He is a partner in the famous gravel mine, owned by Jones Brothers and Reece, and he brought down with him the result of a recent clean-up. We are pleased to state that the mine above referred to is proving to be one of the richest ever discovered in the county. The company has now a force of eight men at work, and last week's clean-up showed net results of about $30 per day to the man. A drift has been run in under the lava about 300 feet and the channel is from thirty to forty feet wide, nearly all of which is pay gravel. The gravel is brought to the mouth of the drift in cars and washed. The cars are four feet long, twenty inches wide and eighteen inches deep, and the dirt averages $6 50 to the car. The gravel is apparently inexhaustible and prospects are good for a continuance of the pay streak. The proprietors of this mine are to be congratulated upon their bonanza. There are other mines in the vicinity which give excellent prospects of proving as rich as the one worked by Jones Brothers and Reece.

Calaveras.

MORE GOOD MINES.—*Mt. Echo*, July 1: It is reported that several mines have been bonded in this section recently, and that a large number of men will be put to work in the near future. The idea seems to have got abroad that there are no good mines in this district save those that are now being worked. This is a great mistake. There are just as rich mines in this vicinity, no doubt, that are idle as those that are in operation. All that is required is capital to develop them.

HOISTING WORKS BURNED.—Cor. Calaveras *Chronicle*, June 30: The hoisting works of the Scorpion mine were entirely destroyed by fire last week. The cause is unknown. No one was in or at the mine at the time, but the people of this city knew something was up when the magazine exploded. The explosion was so great that parts of the machinery were pitched up on top of the hill. Supt. Dennison reports that he will commence work immediately to erect new works.

El Dorado.

ACTIVE AT EL DORADO.—Cor. *Republican*, June 29: Mining interests are very active. The Starlight mine, which has been idle for several years, has been cleaned out and a new company has been organized to work it with new machinery. The Oro Finn, situated south of here, is being steadily and successfully worked. A complete chlorination plant is being built, for which bricks are being made on the ground. They are now employing about 40 men, and will soon have a much larger force. A new company contemplates operating a mine near the old Crystal mine. As a matter of fact, a mining boom has struck us and every one is happy in anticipation of good times and plenty of employment in the future.

SPANISH DRY DIGGINGS.—Georgetown *Gazette*, June 29: The ten-stamp mill on Mr. Hadley's mine is running in full blast and the plates are looming up in fine style; the latest is that they will soon put up ten more stamps.

Nevada.

THREE MINES TO BE STARTED UP.—Nevada *Transcript*, June 30: We understand that five or six men will be here from San Francisco during the coming month for the purpose of finding an investment in some of our mines. It is said that two of them will come here particularly to examine a mine in this district that has not been worked for 10 or 15 years. We also learn that the new owners of the Sneath & Clay mine will be here during the coming month to start up that celebrated mine. It is understood that the Sharp & Nivens quartz mine will be started up during the coming month. When a good start is made upon these three mines there will be not less than 150 more men given employment. These properties are going into the hands of men of very large means and they will be worked upon a very large scale. There are already more men employed here than there have been for years, and the prospect is fine of there being a large increase very soon. The pay-days are near at hand again and the money market will receive a fresh impetus.

THE CENTRAL NORTH STAR. — Grass Valley *Union*, June 30: Superintendent Bennallack informs the *Union* reporter that the operations at the Central North Star mine will soon be in full blast. The new machinery is all in place, and in a day or so the pumping of the mine will be commenced. The shaft is down 230 feet, and in the bottom there is a ledge varying in size from 12 to 18 inches, which prospects well. The force of employes will be increased in a short time. The Central North Star is destined to become a good mine under Superintendent Bennallack's management.

DIVIDEND DECLARED.—Another dividend has been declared by the Omaha Mining Company, the amount being 15 cents per share. This far 15 dividends have been declared and indications are favorable for many more.

Siskiyou.

TO THE EDITOR:—I visited some of the mines in Quartz Valley and the Salmon River country last week and found them even better than they were reported to me to be. The formation in which the most of the mines in Quartz Valley are located is of a pockety character, consequently the ledges are pockety also. The old Shores mine, at present owned by Mr. Myers, is this principal one of the group. This mine was worked some 20 years ago and produced something over $80,000 for its owners. Then it lay abandoned for some time, until it was relocated by Mr. Erno, who sold it to Mr. Myers a short time ago. It is a true pocket ledge, the pay rock only occurring in short or disconnected pay chutes and pockets. In one of the old tunnels that was driven years ago to tap the ledge may be seen quartz that has formed on the porphyry on the sides of the tunnel since it was driven over 20 years ago. Last season, when I visited this mine, I collected some of this quartz which has been formed by the seepage of water through the porphyry overhead into the tunnel, and assayed it, and found that it showed a strong trace of gold. I collected, also, several minute bunches of crystals which formed on the points where the water was dripping from, and took out a couple of blocks containing pick marks which were covered by an incrustation of quartz a quarter of an inch thick that was formed since those pick marks were made. There are several small ledges being worked more or less in the same vicinity. The Eastleck Bros. expect to make a $20,000 cleanup from their hydraulic mine near Oro Fino this season, and the other gravel mines in that locality look favorable for good yields also. There is no drifting being done in the Campbell mine this season, but they are making good use of the water while it lasts for piping in the surface gravel on the south end of the property. The new wagon road from Etna to Sawyer's Bar will be opened by the 4th, when teams can go through to Sawyer's Bar without any inconvenience. The Salmon River country, of which Sawyer's Bar is the main distributing point, has better prospects this season than ever before. That section is attracting more attention from capitalists and prospectors now than any portion of northern California. I visited the Finley, Shaw and Johnson discovery on Jackass creek, which I made mention of in one of my former letters, and found it as rich as reported. Where they have taken out the money so far is from blanket seams of quartz and a curious combination of minerals resembling tellurium, which appear to be feeders of some larger deposit in the ledge of quartz-porphyry above. This quartz-porphyry ledge is about 40 feet wide and can be traced for nearly three-quarters of a mile over the mountain until it reaches the hard iron slate on the head of Specimen creek. This immense ledge or lode prospects well on the surface for low-grade ore, and, should the gold increase when the lode is sunk upon it, will become one of the largest low-grade milling propositions on the coast. So far no definite opinion can be formed of what it will turn out to be, as there has been but little prospecting work done on it. On the opposite side of the creek from this lode is the old Morning Star mine, now owned and being reopened by Captain Clarke, of the Gladstone, in Shasta county. The ledge will average nearly three feet in thickness and has been opened up some 400 feet. It was poorly worked years ago, as the prospect which the waste dump and the tailings from the mill gives plainly prove. The ledge, which is a north and south one, looks and prospects well. John Daggett, the newly-appointed superintendent of the Mint, visited his mines here this week. Mr. Ball, superintendent of the Gold Ball mine, is at his mine attending to some new development work he is having done.

There are only a few white men employed at the Dagget and Gold Ball mines; the rest are Chinamen. Those and the Schroeder mine on the head of Deadwood creek are the only quartz mines that I know of in this county where Chinese miners are employed in preference to white men. The Red Hill gravel mine, situated near the forks of the Salmon and owned by Alex Parker & Sons, is being worked now on an extensive scale and pays a handsome dividend to its owners. The Liberty, which is the extension of the Gold Ball mine, promises to become a good paying property. It is owned by Mr. Joseph Stephens, a merchant of Etna. There is quite a large number of new and valuable ledges being prospected and developed this season in the country tributary to Sawyer's Bar, and all of the placer mines in that locality make a good showing. It is a good country for a prospector who has ample means to prospect on, but it is no place for a prospector without funds to go to. Like most of the localities in northern California at present, there is only employment enough for the miners who live here, and I would advise miners who are looking for work not to come here with the expectation of finding employment, for when a few more men are needed in any of the mines there are always enough idle resident miners to fill the places, and it is only natural that they would be given work in preference to strangers. What the country needs most is capital to develop its mines, and prospectors with means who can afford the time, labor and money to at least partially develop what they find. The Salmon river country is a difficult one to prospect in, as the mountains are rough, high and steep and thickly covered with brush and timber. The geological formation of this section is favorable, however, for permanent milling ledges, being principally slate, syenite and porphyry. There is one old river channel, or portions of one, rather, which lies about 100 feet above the present river bed, on the south side, that is now being opened up in a few places near Sawyer's Bar. This channel is supposed to be very rich, and no doubt will yield considerable of the precious yellow dust in the next few years to come. ALEX QUARTZ.

Sawyer's Bar, July 1, 1893.

Plumas.

COMING TO THE FRONT.—Plumas *National-Bulletin*, June 29: The mining interests of Plumas are coming to the front, and are attracting the attention of mining men to the county. This is a fact, notwithstanding the moss-backed croakers whose strong forte in life is to discourage enterprise and to criticise those who have the push, the ambition and ability either to develop our mines themselves or to secure the investment of capital for that purpose. Witness, if you please, the big operation on the ridge between Gibsonville and La Porte. By sinking a shaft between four and five hundred feet deep, the Thistle shaft people have developed an immense channel of rich gravel, are taking out lots of gold and employing nearly one hundred men. There are several miles of this channel, doubtless containing millions of gold, which will certainly be worked in future, now that its extent and richness have been demonstrated. In Oakland recently a company was incorporated to operate the Good Hope mine near Onion valley. Near Cromberg, in the Tefft mine, now worked by John M. Jackson, is a large and rich deposit of gravel, a channel from which considerable money is now being taken, and not far from the old Parker place, Pit Trayner has interested Eastern capital in a mining enterprise full of promise. The developments and operations at Granite Basin and in the vicinity of Buck's ranch indicate an era of prosperity in that part of the county, while nearer at home are enterprises in contemplation which, if matured, will revolutionize business in this community. In this connection it might not be inexpedient to say that the opening up of the Elizabethtown channel is one of the probabilities of the near future. Its richness has been demonstrated beyond all question, not only by the large quantities of gold found in early days at the head of the channel, but by the work of more recent years by Loring & Laavitt and others on the line of this rich gravel deposit. What ground they were able to work with the inefficient machinery at hand yielded rich returns. With a small amount of capital to put in place adequate machinery, and at the proper place, it is believed by nearly every practical miner who is acquainted with the history of the Elizabethtown channel that a rich gravel mine would soon be opened up. Should this enterprise be inaugurated, it will employ a large number of men and be the means of scattering more money in, and doing more benefit to, this immediate community than almost any other operation that could be suggested, and we are pleased to know that the prospect for opening up this important mine is encouraging. Development work and the erection of a mill are in progress in the Shenandoah mine in French Ravine. The rich ore uncovered there last fall and winter has inspired the firm belief that a rich mine will result from proper exploration, while the practically inexhaustible deposits of ore and flattering prospects at the Hallsted mine on Rich Gulch argue a bright future for that property, if in the hands of capital. From the above references it will be seen that there is an increasing interest and activity as to Plumas county mines, developed and undeveloped. Attention is being attracted to the county. More prospecting is going on than for years past, and there is a greater disposition to take hold of and develop the mines. Let the good work go on. If continued, we shall return to an era of prosperity—of gold producing in large quantities, of good wages and good markets.

IMMENSELY RICH.—Plumas *National-Bulletin*, June 29: On Monday, C. E. McLaughlin received from H. C. Flournoy an immensely rich chunk of quartz, taken only a few days ago from the mine recently discovered by George F. Brown, above and adjoining the Green Ledge, in Genesee valley. Other samples of ore taken from this mine previously indicated that it was very rich, but this chunk, in richness, exceeds the wildest anticipations of the owners and their friends. The quartz is of a decomposed nature, containing much of dark, decomposed, earthy-looking matter, with an occasional streak of copper stain, and almost matted together with gold. It is one of the richest samples of ore we have ever seen, and weighs probable five pounds.

Shasta.

NEW MILL.—Shasta *Courier*, July 1: Miners are anxiously awaiting for the Miller mill at Middle Creek to be completed, so they can get their ore crushed. A few men have been employed at the mill, which is now ready for the new machinery. Mr. Miller is at present in Arizona. The process he intends to use is an electric-cyanide one, and he expects to accomplish great results with it on the base and low-grade ore of this vicinity. The mine owned by Hull, Murray & Conroy, near the divide between Iron Mountain and Whiskytown, four miles from Shasta, is showing up in a way that is most encouraging to its owners. A fine ledge of good rock that prospects splendidly has been uncovered. It is six feet in the face, and it is the opinion of practical mining men that the owners have got the "deadwood" on a big bonanza. The old Manlove mine on Whisky creek, near Whiskytown, is about to pass into new hands. A company of Ashland men are negotiating with J. P. W. Davis for the sale of the mine, and it is reported that the transfer is soon to be consummated. The parties who contemplate taking the mine are well fixed financially. One of them, a gentleman named Walters, was up to Whiskytown inspecting the property a few days ago. The mill at the Cleveland and Tellurium mine at Middle Creek has been closed down for a while this week in order to transfer the pumping apparatus to the Sacramento river, the water supply in Salt creek having given out. One hundred feet of tunnel was recently finished on the property. There are about 18 men employed there, and the indications are most flattering for the opening of one of the best mines in the county. The tunnel on the Cleveland is in over 300 feet, and the ore from it supplies the 10-stamp mill. They are in about 800 feet on the Tellurium and expect to encounter the ledge very soon. The property is under the able superintendency of Mr. Zoellin. The Burleigh drill has been superceded by the old-fashioned "Armstrong" or hand method. A small repairing force is at work at the Lost Confidence, at Iron Mountain, but nothing will be done there this year at least. Some good shipping ore has been encountered in the Little Maud, on Iron Mountain, recently. Dan Haskall owns a quartz interest in the mine, and a company of San Jose capitalists are interested in it. The extent and richness of the recent strike is to be determined by future development. Flat Creek district has some very promising mines, but their owners have nothing but their own muscle to develop them with, hence matters are a little quiet in that section. Water is also getting too low for the miners. It is reported that a new mill will be erected on the Don Carlos in the near future. J. W. Hocking expects to begin work on his mine near Shasta soon. He has a tunnel in a considerable distance and is close to the ledge, which, although about 14 inches wide in the shaft, is of a quality that is rich enough for Joseph. It is reported that Van Meter and partner took out 11 pounds of gold from a pocket near Lewiston, Trinity county, recently.

NEVADA.

White Horse District.

ENCOURAGING.—Walker Lake *Bulletin*, June 28: News from the White Horse mining district, eight miles north of Wadsworth, is very encouraging, all the assays reported going from $100 to $3500 in gold, and there is much excitement. The ledge has been traced for a distance of four miles. The specimens shown by those who have visited the camp are very rich. Over twenty-five locations have already been made. The ledge is gold bearing and promises to bring this section into prominent notice in a short time. Mr. Gregory, who has been prospecting in that district for the past ten years and has sunk six shafts on the ledge at different points, and shows pay rock in every one of them, has been negotiating with Sacramento parties for three months. The Sacramento parties seem anxious to bond Mr. Gregory's claim and have sent up a bond holding it for six months, with the privilege of purchasing the same at the expiration of that time for $15,000. Mr. Gregory is holding off, not liking to tie himself up. He has great faith in the camp. He is a poor man, however, and has labored under great difficulties in prospecting as far as he has.

Jefferson District.

SILVER MILL RUNNING. — Belmont *Courier*, July 1: The Harrison Brothers have made a rich strike in their silver mine at Jefferson. The mill is still running on ore from their mine.

MONTANA.

GOLD.—Anaconda *Review*, June 29: News received from Princeton and the Royal district this week is of the most encouraging nature, and the miners up there will make a fine showing this season. We are glad to state that all the mines being worked there are rich gold-producers, and the silver mine is dropped like a barren lead of white quartz or antimony. The American Eagle is putting on men every day, and ground is being broken on three distinct parts of the claim with a fine output of rich gold quartz. The Royal property is showing up better than ever, and the owners are working only that part of the vein where gold predominates. The Royal placer ground is being put in shape for big hydraulic operations this season, at the same time they are doing an unusual amount of ground sluicing and using the flush of water in every profitable way, thus giving them a fair show for a good clean-up in this crude way of working their rich ground. The little camp of Princeton is receiving an impetus of business that gives it an encouraging outlook for becoming quite a gold camp in the future. Now that silver has taken a tumble the prospectors are giving their attention more to gold properties. It has been known for a long time that there were a number of gold prospects about the Cable district, and a number of Anaconda parties have gone up there to look after some of them. It has just come to our notice that there are eight or nine of the best claims around there that have been bonded to Col. O'Leary, who is ready to make reasonable propositions to parties with small means that are willing to do development work. This is a chance that does not occur very often, and it is likely that it will not be open very long. There has been considerable talk the past week about the recent strikes on Cottonwood. A *Review* man run onto one of the parties recently from there, yesterday, and from him learned that the recent strike in the Old Companion mine is quite rich and that parties have bonded the group of mines that are owned by Sawyer Nelson and others, for

$45,000, and that there is every reason to believe that the bond will be taken up. The new company has arranged to push work, and has put on quite a force of men. There are a number of other claims staked out, and it is said that the outcroppings are traced for over three miles, all of which have been located. This district is located between the two branches of Cottonwood creek, about five miles from Warm Springs. It is very easy of access. It is down grade all the way from the mine to the railroad. There is every reason to believe that a very good camp will grow out of this new district.

ARIZONA.

IN THE BRADSHAWS.—Phœnix *Gazette*, June 30: The mining about this place was never looking better than just now. Joe Mayer has honded his Yankee Girl to Eastern capitalists, and it is reported that the big deal is closed; consideration not known. This company will erect a 40-stamp mill near the Boggs ranch. Frank Thornton and Ed Crover are making preparations to sink on their claim. This is the property that caused so moch excitement last winter. The ledge is 60 feet wide and will average $14 in gold. The Boggs mine is working a full force, and, under the management of Mr. Woodman, it will again appear upon the roll of the great bullion-producers of Arizona. Packard and McCabe are putting in machinery at their camp. When this property is thoroughly opened up it will rank among the greatest mines in this section. Frank Wright is still working the Little Jessie, and his shipments are quite satisfactory. J. D. James is working quite extensively on his group of mines. His mill is kept busy day and night. I. W. Boggs has a force of men working his property in Eogene golch. Mr. B. has been a very successful miner in the past, and we hope his most sanguine expectations will be met with in his last undertaking. W. C. Clark has completed his sampler at Silver Belt, and it is hoped he will be able to get all the ore he can handle. B. L. Woodman and Olpihant have a lease on the Kit Carson. The ore is very high grade, and if thev find a large body they will have a World's Fair stake. E. J. Austin, the gentleman who owns a large interest in the Santa Maria mines, was here a day or two since. Mr. Austin is very enthusiastic over this property. The ledge is 30 feet wide and assays from $30 to $50 per ton. It will be several months before much work is done there, but before many months it will be the liveliest camp in Yavapai connty. Mr. Austin has had maoy offers for it, but he refuses all. Professor James Dooglas was here this week looking after the interests of the Commercial Mining Co.

DAKOTA.

LOOKS LIKE GOOD GROUNO. — Deadwood *Pioneer*, June 29: What our informant, an old and experienced miner, pronounces one of the most important ore strikes ever made in the Black Hills, is reported as having been made northwest of Elk Mountain, on a branch of Squaw creek. It is on ground owned by Levi Ebeling, Wm. K. Howard and John Delaunay, and consists of a vertical vein of dry cement ore 2½ feet thick at the top and assaying at an average of about $70 to the ton. The vein is known to extend clear through the hill, a distance of 1300 feet, as it bas been well opened at both ends, and the owners are now driving a drift from the west side to crosscut it well io. The drift is in 200 feet, and will, it is expected, find the vein inside of a week. This strike, as seems to be happening quite frequently of late, is on an old property on wbich considerable work had formerly been done, but without finding the ore vein. Quite a bit of work has been done on it during the last two years, but it was only recently that the vein spoken of was discovered. It increases in width as it goes down, ahd has every indication of being a large body. Contiguous to this property on the northwest is the McDonald ground, on which a rich vertical vein of the same formation, and which is supposed to be a continuation of the Ebeling vein, has been discovered. The assays from this latter vein run high, showing in many places as much as $180 to the ton. Two thousand feet to the south from the Ebeling vein David Arnold and A. S. Farrell are prospecting a similar vein, or crevice, showing on the top from 15 to 20 inches in thickness, but which assays much lower than either of the others. It lies nearly parallel with the Ebeling vein, and was discovered at a depth of 26 feet, in an old sbaft, which is now being cleared out for extension. These latter gentlemen have a group of 11 claims, and will prospect their present find in tbe hope that it may show up as rich as its neighbors on the north.

UTAH.

AT PARK CITY.—*Record*, July 1: The present week has been a gloomy one in mining circles in the Park, owing to tbe great tumble in the price of silver. The result was that the Daly West, Crescent, Anchor and Silver King closed down and a great number of men were thrown out of employment. The miue owners, however, were confident that the white metal could not be downed, and felt that it was only a question of a short while until it would recover and the mines be able to resume. Their faith was rewarded even sooner than anticipated, and authentic information received this morning showed that their faith was well founded, for silver jumped up to 70 cents. The Anchor and Silver King at once issued orders for the morning shifts to report for duty immediately after the Glorious Fourth. This good news has caosed the town to take on a gayer look, long faces to shorten up and take on a smiling appearance and gloom to give way to sunshine. It is confidently expected that the Crescent and Daly West will follow the lead of the other properties and resume at an early date. Secretary Cole of the Crescent informed the writer that he had been talking with Manager McGregor this morning and that gentlemao had informed him that if the 70 cent quotation on silver was correct the Crescent would resumed at once.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JUNE 27, 1893.

500,526.—PRUNING IMPLEMENT—D. Behmer, Santa Rosa, Cal.
500,465.—CURRENT MOTOR—J. T. Bibb, Tacoma, Wash.
500,527.—PLATFORM—J. B. Brickley, Port Angels, Wash.
500,111.—BILLET-LOOP—F. J. Bringham, Oroville, Cal.
500,469.—BOUQUET-HOLDER—G. A. Burbank, Portland, Or.
500,537.—TRAIN TABLE—A. J. Culbertson, San Andreae, Cal.
500,474.—BITUMINOUE-ROCK MACHINE—W. A. Doble, S. F.
500,485.—ARTIFICIAL STONE—H. Gallinowsky, S. F.
500,491.—LINE-HOLDER—J. H. Griswold, Oakland, Cal.
500,493.—GRATE—J. J. Hall, Willow, Cal.
500,495.—ASPHALT-BOILER—A. Haskins, S. F.
500,497.—SHOELACE-FASTENER—Cornelia F. Hathaway, S. F.
500,253—HARROW—Johnson & Syvrnd, Shelton, Wash.
500,399.—CABLE-PROTECTOR—A. W. Lackey, Gold Hill, Nev.
500,405—GANG PLOW—J. F. Lucas, Centerville, Wash.
500 516.—HARNESS—Snell & Weldon, Santa Barbara, Cal.
22,561.—DESIGN FOR SPOON—W. S. G'Brien, S. F.

The following brief list by telegraph, for July 5th, will appear more complete on receipt of mail advices:

California—Antonio Speal, Loe Angelee, forging hammer; William W. Andrews, Fallbrook, rotary engine; Gustave H. Carlson, San Francisco, eplint laundry basket; Henry Haustein, San Francisco, frame for illuminating tiles; Adam Jeffreys, San Francisco, cable releasing device and orossing; Joshua Swanberg, Loe Angeles, fruit picker; James Nolan, Oakland, gae generator; Silas Pruden, Los Angeles, naillese horseshoe; Carrie S. Cox, Spotswood, pump; William Falconer, Selma, land leveler; Mark Anthony, Berkeley, display stand; Antone G. Rose, Fresno, traction wheel; Richard Savage, San Francieco, ohimney or emokestack; William F. Hess, San Francieco, press for packing bank notee or other currency; Delbert E. Barton, San Francieco, cultivator; Jamee W. Stanley, Gakland, injec'or.

Gregon—Charlee A. Clark, Portland, street sprinkler; Emil Ohrietenaen, Portland, machine for connecting button shanks and fasteners; John J. Dugan, Salem, bedstead; Albert M. Gruhbs, Forcet Grove, game; Joseph L. Lowell, Althouse, car coupling.

Arizona—Joseph L. Giroux, Jerome, steam generator and smelting furnace.

Nevada—John P. Foulks, Verde, air motor.

Washington—William Keywood, Tacoma, automatic air brake.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of soecial mention:

ANIMAL SHEARS.—Arthur D. Reynolds, S. F. No. 499,938. Dated Jone 20, 1893. This invention relates to a sheep-shears and the mechanism for operating the same. The object of the invention is to provide a novel mechanism in connection with cutting shears whereby the jaws of the latter may be reciprocated at a rapid rate of speed; also a means for disengaging the driver at will and a means for guiding the reciprocating parts and for retaining the jaws of the blades closely together.

ROPE-LEADER FOR WINOING DRUMS.—Norton H. Pine, Eureka, Humboldt Co., Cal. No. 499,934. Dated Jone 20, 1893. The invention relates to a rope-leading device for winding drums and consists in a mechanism whereby the rope is caused to wind evenly from one end of the rope to the other, and in an automatic means for reversing the movement of the leader upon reaching either eod of the drum. The object of this invention is to provide an improvement upon a device for a similar purpose patented January 31, 1893; No. 490,984. The present invention relates more especially to the mechanism for reversing the movement of the traveler.

RE-SAWING MACHINE.—Andrew J. Haskell, S. F. No. 499,424. Dated June 13, 1893. In the osual construction of re-sawing machines for lumber it is customary to have two oairs of vertical adjostable rollers between which the lumber to be re-sawed is caused to pass, and by which it is fed to the saw. These rollers are driven by gearing so as to rotate simultaneously in the desired direction. The object of the invention is to do away with a part of the rollers and to substitute an improved means for driving and regulating the speed and certain other details. Certain plates take the place of the rollers formerly employed, and, as they extend well along on each side of the saws, they steady and guide the lumber to prevent aoy irregular movement or variation in the thickness of the two sides. This greatly simplifies the construction of re-sawing machinery.

CONTINUOUS FILE OR INDEX.—Alexaoder J. Rudolph, S. F. No. 499,443. Dated Jone 13, 1893. This continous file or index consists of a series of cards, the faces of which are adapted to receive slips containing the subject-matter of the index, said cards being hinged or linked together at their edges to form a flexible belt; pins projecting from the ends of certain cards in the series; a support upon wbich these pins are carried so that the cards hang in folds of any desired length upon the support; a means for changing or adjusting the pins so that any even number of slip-holders may be introduced at any desired points without altering the hanging of the cards; and in certain details of coostruction and operation. The present invention covers certain improvements on the device patented by the same inventor Sept. 27, 1892, No. 483,312. It is intended maioly for use in large libraries.

The Pacific Mining Agency and Trust Company.

A Corporation Organized Under the Laws of the State of California.

CAPITAL STOCK, $250,000.00. - - - - - - - 2500 SHARES; PAR VALUE, $100.

BOARD OF DIRECTORS:

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THE ANGLO-CALIFORNIAN BANK, LTD....Treasurer. WILLIAM C. RALSTON.....Secretary.

Office: Mills Building, Roome 1 and 2, Ninth Floor, San Francisco, Cal.

Owners of mines desirous of disposing of their properties often have difficulty in finding purchasers, while at the same time there are plenty of people who would invest in mines were they able to obtain exact information concerning them without a personal visit to the properties or without engaging the services of an expert.

The mines are in the mountains or in the foothills more or less distant from the centers of capital where investors are to be found. If the miner comes to the city to negotiate the sale of his property, he does not know to whom to apply; while, if the capitalist is seeking a mine, he has no source of information which will indicate the exact localities where good properties are avallable.

These conditions have resulted in the growth of a class called "*middlemen*" or promoters, who bond the mine from the owner for a specified time, during which they seek a purchaser. The evils of this system are many, but chief among them is the *excessive cost to the purchaser*, while the seller is not henefited beyond his orlginal price.

These promoters, in order to reap a large reward from a single transaction, on which they may work for months, *double, treble or quadruple the original price*, taking for themselves and associates the lion's share of the profit. The result is that mines which would pay a handsome interest on the investment of the sum asked by the owner, fail to realize a suitable profit on the price which has to be paid to the promoters; moreover, the advanced price necessitated by this system often prohibits a sale, and the mine remains tied up during the existence of the bond. There is also an incentive to misrepresentation and exaggeration on the part of these intermediaries, who generally have never seen the property they have for sale.

The mine-owner and purchaser both suffer from this plan of negotiating mining properties. The owner's opportunity of effecting a sale becomes materially lessened after one or more failures from this source since this necessarily results in a diminution in value; and if a purchaser buys at an unwarranted cost his expectations are not realized.

All these features, now well recognized, have discouraged investment in mining properties, much to the injury of the mining industry, owners aod prospectors.

One of the objects for which the PACIFIC MINING AGENCY AND TRUST COMPANY was formed is to try to sell mines and mining claims and ditch properties and water rights *on commission*, and to act as agent and broker for the sale and purchase of such properties. It is intended, however to eliminate the objectionable features of the "promoter" system above alluded to, by placing the property on sale at the price fixed by the original owner, without any advance and charge the said owner a suitable commission, to be previously agreed upon.

In other words, it is intended to conduct the purchase and sale of mining claims and ditch properties and water rights on the *same basis as a real-estate transaction*. The seller will be asked for a suitable description of his property, with maps, statement of development, record of title, and, if possible, a report upon it from some reputable mining engineer or expert. These papers will be placed on file in the office of the Company, for which service a fee will be charged in advance. All this will be readily accessible to any person looking for investment in this direction, and it is expected that the standing of this Company will be such that the information in its possession will be sought for.

It is not proposed to do more than to conduct the negotiations between the *buyer* and *seller*. *The Company is prohibited by its articles of incorporation from buying or selling except upon the commission or a agent or factor of others.*

The buyer pays no fees whatever, and there is no incentive to advance the price beyond the original figures at which the price and commission have been fixed.

The commission charged by the Company will he a matter of private agreement with the owner, based on the magnitude of the transaction, rangIng from 5 per cent net as the minimum to 20 per cent as the maximum.

The subject of *expert examination* of properties will be a matter of private arrangement between the Company and buyer or seller.

This, in brief, is the system by which the PACIFIC MINING AGENCY AND TRUST COMPANY proposes to conduct the purchase of mining and ditch properties. It is desirous of obtaining such properties from first hands so that matters may be conducted on a legitimate business basis, and does not wish to negotiate with those who are asking exorbitant and unwarrantable prices by reason of their intermediary position.

It is not intended only to negotiate the sale of an entire property, but interests in such may be sold, or money obtained for development work, erection of reduction plants, purchase of machinery, and so forth, under suitable conditions.

The Company has no lotention of having any transaction in mining stocks, there being already plenty of opportunities for dealing in that direction. It is in a position to acquire and impart information of any kind relating to the merits, value and title to mines, mining claims, water and ditch properties, and water rights.

Non-residents who have *interests* which they wish looked after, or concerning which they desire *special information*, may obtain the services of the Company, for which a fee will be charged in accordance with the character of the work to be done.

The PACIFIC MINING AGENCY AND TRUST COMPANY will endeavor to assist mining engineers, superintendents, foremen, miners, mlllmen, assayers, and others connected with the mining industry, to obtaln employment. Those desirous of our assistance in this connection will be required to fill out a blank (which will be forwarded on application) setting forth the positlons required, wages expected and references. A small fee will be charged those who obtain positions by this means. Correspondence is solicited from managers, superintendents, and others in need of men.

The Company does not confine its operations to the State in which its principal place of business is situated, but includes all the principal centers of mining operations in the United States.

Arrangements are being perfected for suitable connections in New York, Chicago, Boston, London, Paris and other important financial centers, and agents will be selected in the larger mining towns of the Pacific States and Territories.

Those who conduct the business of this Company have had long experience in mining operations, and it is their intention to place it in a position to inspire the confidence of the community in its integrity and fair dealing. Every one at all familiar with such matters knows the *difficulty* which has existed in bringing the *buyers and sellers* of mines together and of obtaining desired information concerning the various matters connected with the business. This Information the Company proposes to supply to those requiring it; and it expects to negotiate the purchase and sale of mines at the *least expense* and *trouble* to the *interested parties*.

Mine-owners, managers and superintendents are invited to call at our offices when in San Francisco, or to correspond with the Company on the subjects herein referred to, and further particulars will be promptly supplied on demand.

Market Reports.

The Markets.

SAN FRANCISCO, July 6, 1893.

Following the break in silver of last week, and the unprecedented depression of prices, there has been a reaction that seems fair to restore silver to the position it occupied before the closing of the Indian mints. The New York market was quicker to go down and quicker to recover than the London. The turn in the tide occurred last Friday, when silver in New York advanced from 62 to 63 cents; the following day it was up to 70, and yesterday silver touched 75 in New York. In London the lowest point was reached Friday, but yesterday it had advanced to 34d from 30½d.

Inquiry at the Treasury Department yesterday as to whether the amount of silver offered the Government was as large now as formerly, developed the fact that for the first six months of the current calendar year the offers aggregated 52,300,000 ounces, while for the same period last year they were only 45,350,000, showing an excess for the corresponding period this year of 6,950,000, which would indicate that the production of silver is not falling off in the United States. The amount of silver bullion imported for the first six months of the current calendar year, including that in ores, was 8 471,000 ounces, while there has been exported 11,968,000 ounces. Of the amount of silver effered to the government during this period, 27,000,000 ounces were purchased. The proposition which has been talked of about a resolution being introduced at the extra session giving the President power to suspend—until such time as he may see fit—the purchase of silver hullion, is one that does not meet with approval, and the silver men say they would fight such a proposition with as much vigor as they will the repeal of the Sherman law; for they believe the effect of such a resolution in the hands of Cleveland, whose views on silver are well known, would he the same as repeal.

Coinage of Indian Mints.

Since 1875 Indian Mints have annually turned out the following amounts of silver coins, as expressed in American dollars:

1875	$23,830,686
1876	12,410,636
1877	30,518,415
1878	78 741,556
1879	28,122,004
1880	40,002,173
1881	20,682,625
1882	29,386,322
r883	24,927,400
1884	17 353,531
1885	48,487,114
1886	27,121,414
r887	44,142,013
1888	36,297,132
r889	37,927,814
r890	57,931,323
1891	32,670,498
Total 17 years	$590,562,656
Annual average	34,150,714

The coinage for the calendar year 1892 is not at hand, but is supposed to have been about $30,000,000. The figures in the above table are for the calendar year.

NEW YORK, July 6.—Following are the closing prices for the week:

	Silver in London.	N. Y.	Copper.	Lead.	Tin.
Thursday	31⅛	62	10 50	3 40	.....
Friday	30¾	63	10 60	3 50	19 25
Saturday	33¾	70	10 60	3 50	19 25
Monday	33½	72	.....	.....	.....
Tuesday	....	....	.....	.....	.....
Wednesday	34¾	75	10 95	3 75	19 20

San Francisco Metal and Coal Market.

ANTIMONY.		**STEEL.**	
Per lb	— @ 14	English, lb	— @ 18
BORAX.		Canton tool	— @ 8½
Refined, in car lots	— @ 7½	Sl'k Diam'd tool	8½@ 15
Powdered, do	— @ 7½	Pick & Hammer	6½@ 10
Concentrat'd, do	— @ 6½	Machinery	4 @ 5
All grades jobbing at advance.		Toe Calk	— @ 4½
COPPER.		**TINPLATE.**	
Bolt	22 @ —	B. V. steel grade	
Sheathing	22 @ —	14x20, spot	— @ 5 87½
Ingot, jobbing	— @ 14½	Charcoal, 14x20	— @ 5 87½
Do, wholesale	— @ 13½	Do roofing, 14x20	@ 5 87½
Fire Box Sheets	22 @ 24	Do, do, 20x28	— @11 75
IRON.		**PIG TIN.**	
Bar, base	— @ 3	Spot ℔ lb	— @ 24
Norway, base	— @ 4½	**COAL.**	
PIG IRON.		**SPOT FROM YARD—PER TON.**	
	Spot.	Wellington	$8 00
Eglinton ℔ ton	20 00@—	Greta	7 50
Olengarnock	21 00@—	Nanaimo	8 50
Am. Soft, No. 1	22 00@—	Oliman	8 00
Shotts No 1	22 00@—	Seattle	8 50
Puget Sound	20 00@—	Coos Bay	5 50
Clay Lane White	21 00@—	Cannel	8 50
Langloan	22 50@—	Egg, hard	12 00
Carnbrie	22 50@—	Wallsend	7 25
Sarrow	22 50@—	Scotch Splint	8 00
Carronfleet	22 00@—	Brymbo	7 50
CHROME IRON ORE.		West Hartley	8 00
Per ton	10 00 @—	**TO LOAD—PER TON.**	
LEAD.		Australian	8 37@—
Pig	— @ 4½	Liverpool Steam	8 50@—
Bar	— @ 5½	Scotch Splint	00@—
Sheet	— @ 7½	Scotch Splint	00@—
Pipe	— @ 6½	Cardiff	5@—
SHOT.		Lehigh Lump	11 00@—
Drop, sizes *smaller* than B, ℔ bag of 25 lbs	$1 80	Cumberland	12 00@—
Do do, B and *larger* sizes ℔ bag of 25 lbs	2 00	Egg, hard	10 00@—
Buck, Balls and Chilled do, ℔ bag of 25 lbs	2 00	West Hartley	7 50@—
QUICKSILVER.		**COKE.**	
Home trade, pr. flask	42 50 @43 00	English, to load	$9 50@10 00
		Do, spot, in bulk	—@10 00
		Do, in sacks	—@11 50
		Cumberland	9 50@—

Mining Share Market.

The stock boards opened for business after the holidays on Wednesday, but found it rather dull times. News from the mines, however favorable, had little effect. As the principal properties dealt in on the stock boards are silver-producers, and silver is at the biggest discount ever known, it is hard to put any life into the market. Although the mines in Colorado, Montana, Idaho and Utah are shutting down, so far the Comstock has escaped, though there are few men now employed there as compared with a few years ago. The large percentage of gold in the ores of the principal mines is greatly in favor of the Comstock. Still the trading in shares is by no means an exciting business in these days, when changes in value are in cents instead of dollars. Sales are moderate at low prices. The companies put off their delinquent sales as long as possible because they often have to buy in most of the stock on company's account.

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ASSESSMENTS.

COMPANY AND LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T AND SALE.	SECRETARY.
Alta M Co, Nev	43	15c	April 25, Juue 21, July 12	L Osborn, 309 Montgomery	
American and Mexican M Co	10	2c	June 28, July 31, Aug 19	F M Husted, 522 Moutgomery	
Best & Belcher M Co, Nevada	54	25c	June 6, July 14, August 4	L Osborn, 309 Montgomery	
Oons New York M Co, Nevada	10	100c	May 19, June 16, July 10	C E Elliott, 309 Montgomery	
Crocker M Co, Arizona	14	5c	June 8, July 13, August 3	A Waterman, 309 Montgomery	
Crown Polut M Oo, Nevada	61	25c	June 12, July 18, August 8	J Newlands, Mills B'l'g	
Derbec Blue Gravel M Oo, California	11	5c	May 31, July 5, July 27	T Wetzel, 320 Sansome	
El Leopoldo M Co, Mexico	3	5c	May 25, July 1, July 20	Jabez Howes, 214 Pine	
Exchequer M Co, Nevada	30	10c	June 29, Aug 1, Aug 29	C E Elliot, 309 Moutgomery	
Hale & Norcross S M Co, Nevada	100	50c	June 21, July 27, Aug 18	A B Thompson, 309 Montgomery	
Inyo Marble Co, Cal	20	5c	May 22, June 26, July 20	W W Sargeut, Mills Bldg	
Justice M Co, Nevnda	54	10c	May 15, June 19, July 7	R E Kelly, 309 Montgomery	
Lady Washington Cons M Co, Nevada	9	100c	April 18, May 23, July 11	L Osborn, 309 Montgomery	
Peer M Co, Arizona	15	5c	June 8, July 12, August 2	A Waterman, 309 Montgomery	
Occidental Con M Oo, Nevada	13	100c	June 22, July 26, Aug 17	A K Durbrow, 309 Montgomery	
Peerless M Co, Arizona	20	5c	June 15, July 20, Aug 10	A Waterman, 309 Montgomery	
Red Jacket Cons M Co, Nevada	1	5c	May 24, July 15, August 5	S M Capp, 415 Montgomery	
Savage M Co, Nevada	81	25c	June 20, July 25, Aug 14	E B Holmes, 309 Montgomery	
Silver Hill M Co, Nevada	33	5c	May 29, July 5, July 28	D O Bates, 309 Montgomery	
Utah Cons M Oo Nevada	18	10c	June 16, July 18, Aug 5	A W Havens, 309 Montgomery	
Weldon M Co, Arizona	7	5c	June 15, July 16, Aug 9	A Waterman, 309 Montgomery	

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Benton Con M Co, California	Anuual	V B Allen, 538 Sacramento	July 20
Best & Belcher M Co, Nevada	Annual	L. Osborn, 309 Montgomery St	July 13
Dora G M Co, California	Annual	J. Blumenthal, 415 Montgomery St	July 27
Overman M Co, Nevada	Annual	O. D. Edwards, 414 California St	July 13
Savage M Co, Nevada	Annual	E B Holmes, 309 Montgomery	July 20
St. Charles G M Co, California	Annual	F F Ryer, Chronicle Building	July 8
Union Con M Co, Nevada	Annual	O E Harvey, 309 Montgomery	July 17
Yellow Jacket M Co, Nevada	Annual	W H Blauvelt, Gold Hill	July 17

DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE
Bulwer Cons M Oo, California	5	L Osborn, 309 Montgomery	Oct 20
Champion M Co, California	10	T Wetzell, 310 Pine	May 15
Cons New York M Co, Nevada	10	C E Elliott, 309 Montgomery	Feb 15
Great Western Quicksilver M Co	25	A Halsey, 328 Montgomery	Oct 8
Mayflower Gravel M Co, California	10	D M Kent, 330 Pine	June 30
Pacific Coast Borax Co., California	1 00	A H Clough, 230 Montgomery	Jan 10
Standard Cons M Co., California	10	J W Pew, 310 Pine	July 25

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, July 6 1893.

9:30 A. M. SESSION.

500 Alpha	5c	30	30c
100 Belcher	45c	400 Mexican	65c
105 Best & Belcher	55c	50 Ophir	1.10
50	50c	100	1.05
500 Obbiar	40c	250 Potosi	90c
100 Oon. Cal. & Va	1.45	250	85c
300	1.40	150 Savage	35c
400 Crown Point	25c	50 Sierra Nevada	55c
300 Gould & Curry	45c	100 Union	50c
120 Hale & Norcross	25c	850 Yellow Jacket	85c

2:30 P. M. SESSION.

1200 Alpha	5c	350 Gould & Curry	40c
300 Andes	15c	100 H & N	25c
100 Belcher	35c	100 Mexican	65c
100	30c	150	55c
300 Best & Belcher	45c	550 Ophir	1.00
400	40c	150 Potosi	70c
100 Caledonia	5c	350	65c
500 Challenge	10c	600 Savage	30c
500 Chollar	35c	1400 Seg Belcher	5c
620 Con. Cal. & Va	1.35	250 Sierra Nevada	50c
150	1.40	100 Union	50c
150 Confidence	45c	300	45c
800 Crown Point	20c	400 Yellow Jacket	75c

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Table of Contents.

The following brief abstract of the contents will give an idea of the branches of the subject treated:

General Plan; Discussion of the Principles of Hydraulics; Rules Deduced from Formulæ Obtained; Examples and Calculatione; Extensive Tables for Ready Reference; Fundamental Laws of Hydraulics Demonstrated and Expressed in Formulæ and Rules; Flow of Water through Openings; Weir Coefficients; Trlangular Weirs; Flow of Water Over Quadrant Weir (tabulated); Application of Tables; Submerged Orifices; Flow Through Orifices in Thin Partitions; Tables and Applications; Miners' Inches; Tables and Calculations; Flow of Water Through Short Tubes and Compound Tubes; Flow of Water Through Pipes; Tables of Velocities and Cubic Feet Flows for Given Fall per Mile and Diameter of Pipe; Coefficient for Bend—Circular and Angular Flow Through Nozzles; Inverted Siphons; Flow of Water in Open Channels; Extensive Tables; Rough and Ready Notes; Hints for Speedy and Approximate Estimates, etc.

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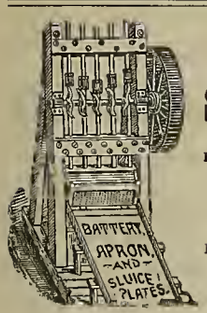

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An Illustrated Journal of Mining, Mechanics and Popular Science.

VOL. LXVII.—Number 3.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, JULY 15, 1893.

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Drift Mines in Placer County.

Continuing Mr. Ross E. Browne's description of the ancient river beds of the Forest Hill divide, commenced in the last number of the PRESS, he says that from the frequent displacement of the streams during the second period described, there have arisen various complications in the channel systems. Although the mining developments are extensive in portions of the district, it still remains a difficult matter to separate the channel systems of the second period, and it is not always easy to distinguish between those of the first and second periods. In a general way it may be said that the channels of the second period differ from those of the first as follows: their beds are narrower, rims steeper, and accumulations of bedrock gravel incomparably smaller.

The following may be said concerning the gravels in the deeper channel bottoms, and their immediate volcanic cappings: The characteristic channel deposit of the first period consists of a large body of gravel of exclusively bedrock material, and a light cement capping; the characteristic channel deposits of the second period, either of a small body of bedrock gravel and a heavier cement capping, or of a large body of volcanic gravel and a heavy volcanic conglomerate and cement capping.

A continuous cap of so-called pipe-clay generally indicates the first period.

Where one deep channel cuts across the deposit of another, the channel which does the cutting belongs, as a rule, to the second period. The channel which has been cut may belong to either period. A careful study of the immediate volcanic caps of the gravel deposits by a competent specialist in petrography may lead to important criterions in classifying the channels. It will be evident that Mr. Browne's opportunities have been mainly for a study of the topographical features.

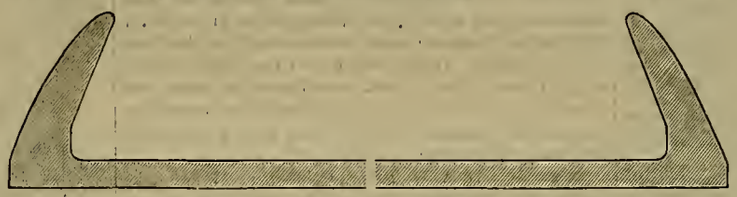
There occurs occasionally very large accumulations of bedrock gravel between the deposits of volcanic cement, which are evidently the result of the cutting and dislodgement of sections of the old deposit. (See figure 6; figure 5 is omitted.)

The upper body of quartz gravel shown in the figure is such an occurrence. It has not been explored to any great extent, and the limiting lines in this section are conjectural.

The section in figure 6 shows an interesting occurrence. The cement filling the bed to a depth of 100 feet is a more uniformly fine-grained sediment than is commonly encountered. It incloses a number of oak and cedar trees standing on the banks of the channel, with the roots intact in the gravelly soil and bedrock. One of these is a cedar nearly 100 feet in height and four feet in diameter at the base, and stands perfectly upright, and, considering its age, is in a surprising state of preservation.

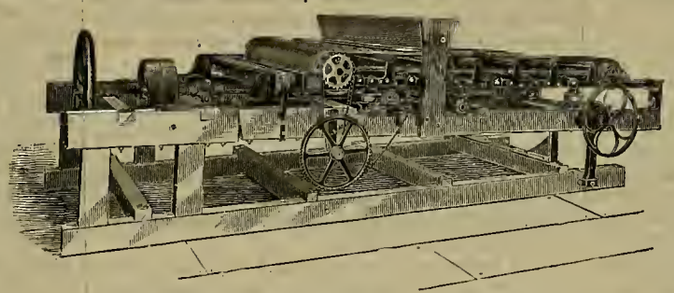
Similar standing trees are found in the Bowen mine, in the same channel. These trees are immediately on the shore line of the shallow deposit of gravel, and show that for a few centuries at least before the depositing of the volcanic material the stream was a small one. (See figure 7.)

These standing trees show also that the first flow of the cement was not torrential, though moving with a certain velocity. The existence of a current and its direction are plainly indicated by the structure of the deposit immediately surrounding the trunks of the trees.



CROSS SECTION OF BLASDEL CONCENTRATING BELT.

The Weske channel is apparently one of the earlier channels of the second period. It is cut by a slightly deeper channel, which is filled to a considerable depth with a coarse, volcanic gravel, containing large, water-worn bowlders of lava, mixed with a certain amount of coarse bedrock gravel. The whole is capped with hard cement and conglomerate. By following the course of the Weske channel it will be seen that it, in turn, cuts and recuts the Paragon and May Flower channels.



THE MC GLEW ORE CONCENTRATOR—*See page 35.*

Fig 6.

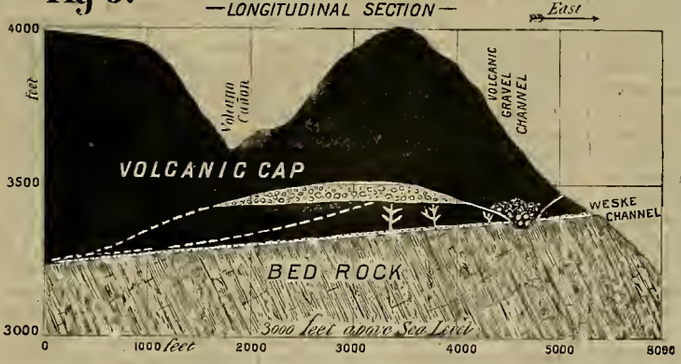
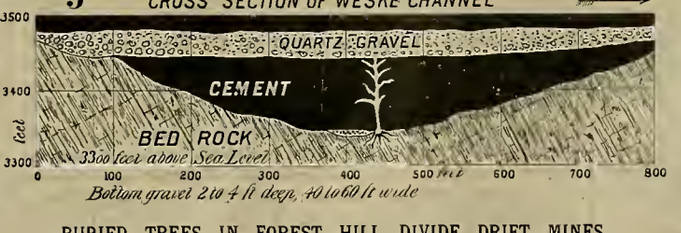


Fig 7.



BURIED TREES IN FOREST HILL DIVIDE DRIFT MINES.

The Blasdel Concentrating Belt.

This practical invention is the result of many years' experience in the milling and concentration of gold and silver ores. The difficulty which formerly attached to the use of a flanged belt has been overcome by constructing the flanges at an acute angle toward the center, thus enabling it to pass over the end rolls or drums of the machine without breaking or cracking. This adds to the durability of the belt, and millmen have been quick to recognize its advantages. It is claimed that these belts will handle more pulp and will save a higher percentage of values of the material passing over them than others, because at intervals of two feet there is a space of one inch in the surface of the belt which contains 20 riffles, one thirty-second of an inch in depth. These are very effective in saving floured sulphurets (which are always the richest) and quicksilver that would not stop on a smooth belt.

These small riffles prevent channels from forming down through the center of the belt and the sand from packing on the edges. They have great value when used below settlers in pan-mills, saving not only sulphurets and globules of quicksilver, but also the granulated, which carries off much of the precious metals.

Ore-concentrating machines have added more to the material wealth of the country than people not engaged in the business have any idea of. There are reports from a number of mines where the value of the sulphurets is more than double that of the free gold extracted; and from one mine crushing 80 tons per day, the free gold extracted by passing the pulp over amalgamated plates is only about $1 per ton, while the yield from the sulphurets is over $3.

One party having 20 stamps which had run for some years without using concentrators, believing the percentage of sulphurets was so small that it would not pay, was induced to try them, and found that his income from the 20 stamps was increased over $40 per day, which had hitherto been lost. Some mines, in addition to the value of the sulphurets, have rusty gold that will not amalgamate by passing over plates. This, of course, is saved when passed over concentrating belts.

The accompanying (cross section) cut gives a fair idea of the flanges as herein described.

Many of the Blasdel belts are already in use, and the demand is increasing as their merits become better known.

BAD FOR PENINSULA MINING.—Pedro Victoria, Collector of Customs at Ensenada, has received a circular advising him that the export tax on bullion from Lower California will from July 1st be $75 per thousand, or nearly 8 per cent. The rate for some time past has been about 3 per cent. The new duty will have a bad effect on the mining industry of the peninsula.

THE East Wellington coal mines at Nanaimo, B. C., were closed down Tuesday, owing to the decision of the miners, who refused a reduction of 20 per cent. The men held a meeting last Sunday and decided to accept a reduction of 10 per cent. This was accepted by the manager until further instructions.

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W. B. EWER. }
CHAS. G. YALE, } ..... EDITORS

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San Francisco, July 15, 1893.

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The Silver Men Active.

The free coinage men and silver miners are holding conventions and mass meetings all over the country. They are passing resolutions selecting delegates to coming conventions and busying themselves in every way in behalf of the white metal. The Colorado State Silver Lesgue at a meeting in Denver this week, listened to some pretty warm speeches, armed revolution being practically advocated by Governor Waite. Judge Kerr of Pueblo spoke in the same inflammatory vein as Governor Waite. He indorsed the recent revolutionary telegram sent East, in which it was declared that if the war upon silver continued it would result in the West repudiating all of her obligations; that 150,000 men would be paupers, that 500,000 people were on the verge of starvation, and that revolution would be the final result. It was then moved that the convention indorse the remarks of Governor Waite. The motion was carried amid the greatest enthusiasm. The committee on resolutions has adopted an address to the people of the United States warning Eastern capitalists that wide-spread ruin will follow the repeal of the Sherman Act. They state that there are already 15,000 idle miners in Colorado, and there will soon be 400 more from the smelters.

A silver mass meeting called by three organizations—Board of Trade, Chamber of Commerce and Business Men's Association—at Lester Park Pavilion, Ogden, on Tuesday was attended by thousands of people. Permanent organization was perfected, A. B. Patton, President of the Board of Trade, being elected chairman. Radical silver speeches were made. The object of the meeting was to further organization in Utah Territory and elect delegates to the Silver Conventions at Denver, St. Louis and Chicago.

In Montana the Free Coinage Association met, organized and adjourned within 24 hours, but did lots of business in that time. Never before in the history of the State has there been such a convention. Never were so many interests represented and working harmoniously, zealously and effectively for the accomplishment of a result. Mine owners, mine managers, smelting and milling superintendents, bankers, business men, State and federal officials, lawyers, laboring men, physicians and even ministers of the gospel worked and voted as one man. A large list of delegates—all prominent men—was selected to go to the Bi-Metallic League in Chicago, and afterward to Washington.

At Spokane, Wash., the sentiment of the big meeting was unanimously in favor of sustaining silver and upholding the mining industry of that section. A resolution was adopted calling upon the members of Congress to demand free and unlimited coinage of silver and oppose the unconditional repeal of the Sherman Act. All the silver clubs of Nevada have been called together in mass convention in their respective localities to pass resolutions or protest against the repeal of the Sherman law. Most of them will meet July 15th. Delegates will be chosen for the Chicago convention.

We have not space for the various resolutions adopted, which, however, were much of the same tenor, denouncing the "gold-bugs" and protesting against the unconditional repeal of the Sherman Act.

Cost of Production of Silver.

The cost of production of silver is a very serious question in these days. Most of the miners say they cannot produce it at any profit when it is less than 80 cents an ounce. Some of them cannot do it for that. A recent investigation by U. S. Senator Stewart resulted in showing that it cost more than it was worth at par value to produce it. In a report of the Senate Committee on Mines and Mining there is much interesting testimony. Prof. James D. Hague says the cost of production on the Comstock per ounce of fine silver ranged from a minimum of 35 to 40 cents on the production of the big bonanza in its most prosperous period, and disregarding all prior and subsequent assessments to a maximum of $2.10 on the production of non-dividend paying mines. Taking all their assessments into account, the average cost of all the silver produced on the whole lode from the beginning has been $1.10 per ounce. The average cost of the silver product of the United States for 1891 was 85 cents per ounce, not allowing for assessments or other forms of new capital invested in the business. The following are fair samples of the mass of testimony:

Ex-Senator H. A. W. Tabor, Colorado: "If we take into account the large plants of machinery left on exhausted mines, and the many millions of dollars' worth of work without results, silver costs, as a whole, $1.50 an ounce."

Ex-Senator N. P. Hill, Colorado: "My opinion is that, adding to the cost the losses of all the unprofitable enterprises in silver mining, the total average cost for the past ten years in producing silver in the United States would amount to more than $1.29 per ounce."

W. C. Wynkoop, editor of the *Mining Industry and Tradesman*, Denver: "In 1890 I secured the reports of about 160 incorporated mines which produced silver during the preceding year. Taking the companies which did not make a profit in connection with those which did, the cost was about $1 15 per ounce." For the whole United States, Mr. Wynkoop believes the silver produced has cost on an average of $2 an ounce.

W. F. Reinert, editor of the *State Mining Journal*, Denver: "I think it quite safe and very conservative to estimate the average cost of producing an ounce of silver in Colorado at from $1.50 to $1.75."

Louis A. Garnett, San Francisco, estimates the cost of the silver produced on the Comstock at $1.50 per ounce. Simeon Wenban, of San Francisco, states that he can furnish bullion from one of his mines in Nevada at a cost of 63 cents per ounce, but thinks that all the silver produced in Nevada has averaged not less than $1.30. William H. Watson and L. A. Raymond, San Francisco: "We can safely say in our experience that every dollar of silver we obtained cost us at least $2." William E. Sharon, James H. Kinkead, D. B. Lyman, A. J. McDonnell, E. Boyle and C. C. Thomas, the leading mining superintendents on the Comstock: "The cost of producing an ounce of silver on the Comstock to-day is $1.37." R. K. Colcord, Governor of Nevada, puts the cost of all the silver produced in that State at over $1.50 per ounce. Surveyor-General J. E. Jones, Nevada, estimates it at from $1.50 to $2.

The report states that 99 per cent of the supposed discoveries and locations of mining claims on which money and labor have been expended have produced nothing and are failures. All this appears to be charged up to the productive mines, as regards the value of their output.

In the report of the Director of the U. S. Mint for 1887 is a very elaborate statistical article on this subject of cost of production of silver. In that is an abstract of a report of Prof. Roberts Austen, chemist to the Royal Mint, on this same subject. In this is considered (1) silver contained in gold, or silver obtained from refining native gold. Silver from this source is estimated as costing 2½d, or only five cents per ounce. In (2) silver contained in lead ores, or obtained by the desilverization of lead, the cost is estimated at 2s. For silver contained in copper ores, or obtained by the desilverization of copper and cupriferous products, the cost is 1s 11d. For silver ores, or silver obtained from ores in which silver is the principal metal, the cost is 1s 5d. The mean cost is 1s 8d, or 40 cents per ounce. This surprisingly low estimate is reached not only by the exclusion of cost of real and personal property and plant, or interest and amortization on expended capital, and cost of transportation or of exploration and development; but, in the case of the major part of the product, costs of mining and reduction.

The U. S. Mint Director in that same year addressed interrogatories to producers in this country, and received many replies. The results were not very satisfactory, but serve as the best basis attainable. From the appended calculation it will be seen that for the given selection of enterprises in California, Arizona, Colorado, Montana and Utah the mean cost of producing one fine ounce of silver, the selection being limited to 155 in number, is not less than $0.524. This is exclusive of all allowances on capital account for amortization. The 12 enterprises selected in Montana produced two-thirds of all the silver of that region. The five mines in Utah yielded over two-thirds of the product of that Territory. The Colorado properties were distinctly silver mines. The Daly and Ontario were included in the Utah mines. The four California mines were producing silver and no gold. The summary is as follows:

State or Territory.	Number of silver mines selected.	Product of silver—Fine ounces.	Average working cost of producing one ounce of refined silver	Total working cost of producing silver	Mean working cost in ounces.
Arizona	5	1,119,562	$0.832	$931,475	
California	4	237,737	.51	121,246	
Colorado	129	4,420,642	.61	2,696,691	
Montana	12	8,072,993	.433	3,495,506	
Utah	6	3,804,453	.525	1,997,338	
Total	155	17,655,387		$9,242,256	$0.524

A Steam Generator and Smelting Furnace.

Joseph L. Giroux, of Jerome, Arizona, has patented through the MINING AND SCIENTIFIC PRESS Patent Agency, an invention to combine with a smelting furnace devices for generating steam whereby the heat employed in smelting the ore is utilized in producing steam power to be used for driving engines and other machinery. The furnace is of usual construction having the stack and feed door. The body of the furnace is composed of concentric outer and inner walls. The outer wall is preferably made of boiler iron, and the inner wall is made of heavy copper and the two are connected together by numerous stays to resist the pressure which is generated between the two. There is a brick lining of the crucible in the lower part of the furnace and upon which it is supported. There is the usual settling pot into which the slag is discharged from the slag tap and an overflow pipe which delivers the slag after the pot is full.

A water tank is so situated with reference to this discharge overflow pipe that the slag falls into the water tank where it becomes disintegrated and granulated and falls to the bottom. The water is thus heated and displaced and flows over into another tank placed beside the first one. From this latter tank the heated water is pumped into the jacket surrounding the furnace, being delivered around the bottom and rising as it is heated. Whenever a sufficient amount of slag has been received into the first tank a gate is raised and the water will wash the granulated slag out.

This first water tank into which the slag passes is designed to hold about 500 gallons of water, and by the discharge of about 100 gallons the slag will be cleared out from it at any time. From the upper part of the jacket which surrounds the furnace four large pipes lead to a boiler. This boiler is situated at such an elevation with relation to the water jacket of the furnace that the latter will always be kept full of water, and it and the boiler are constantly supplied to retain the proper level in the boiler by means of the pump before referred to, the water being heated so that it is delivered into the water jacket at very near boiling point. By means of the large connecting pipes, a free discharge of steam into the boiler is permitted without its carrying the water with it. The lower part of the inner jacket is curved so that the space at the bottom of the jacket is shaped to easily deliver and discharge through a valved outlet any sediment when the jacket is to be washed out. There is an air-drum surrounding the furnace and having six or more tuyeres opening therefrom in the usual manner.

Mr. Giroux, in his drawing, shows additional small tuyeres passing through the brick lining of the crucible by which a supplemental blast may be introduced, thus making the smelting more rapid.

By this arrangement the inventor states he is enabled to provide one or more steam boilers with any desired steam pressure and keep it up as long as the furnace is in operation, while, at the same time, the slag is easily disposed of. It serves to heat the water before the latter is introduced into the water jacket, and the labor of removing the slag from the furnace is dispensed with. The small tuyeres spoken of are connected with an air-compressor which will give an air pressure of about ten pounds, while the blast drum from which the air is delivered through the other tuyeres is supplied from a blower which will give a pres-

sure of abont ten ounces. The reason for this is that the air from the main tuyeres is delivered among the loose ore and fnel and easily passes through it, but the air from the small tuyeres is delivered directly into the melted metal within tbe crucible, and must, therefore, have snfficient pressnre to overcome that of the metal and prevent the latter from entering the tnyeres.

The McGlew Ore Concentrator.

One of the latest candidates for public favor among the endless belt concentrators, now the favorite type, is the McGlew, an engraving of which is given on this page. The work recently accomplished by tbis machine on the Shasta county ores has attracted tbe attention of mining men, numbers of whom are visiting the oompany's works at 132 Main street to see it in operation. As will be seen from tbe cut tbe main frame is of wood, carrying the table and revolving belt. The upper portion of this frame is hinged so that the lower end may be raised or lowered to alter the inclination of the belt. Tbis hinged part of the frame carries the iron table above wbich the belt operates.

The iron table rests on four steel balls which are in sockets one at each corner, thus admitting of tbe table being given tbe necessary motions similar to that of a miner's pan or batea. The belt itself is preferably of canvas suitably waterproofed. In the edges of the belt are strong ropes which fit in grooved rollers at top and bottom keeping the belt perfectly in position and preventing it getting ont of line or off the rollers. As the upper part of the rope on each edge projects above the belt it serves as a sort of flange to keep the material being treated passing over the sides of the belt when side sbake is imparted. As will be seen from further description this belt is entirely independent of the motive power; tbat is, it is operated by the mechanism and operates none itself.

Rnnning lengthwise the machine and under tbe table is the driving shaft having the usual pulleys at the upper end. Just below the pulleys there is a universal joint so as to permit tbe elevation or depression of the lower end of the table and belt. Near each end of this shaft are eccentric cams by which tbe side shake is imparted to the table carrying the rollers and belt. Near the lower end on the same shaft is a spiral cam, giving an end motion to tbe table toward the lower end, and an adjustable four-leaved spring throws the table hack. This end shake is susceptible of regulation wbile the machine is running, by moving the wheel controlling the spring. The spring regnlates the percussion, and a set-screw adjusts the cam to give more or less throw. In connection with tbis part of the mechanism, there is at the upper end a set of rubber bnffers fastened to the sliding face of tbe head of the bumper and there are side springs to check side motion. Tbis sliding bumper is independent of the main table, and is intended to relieve the friction when both side and end shake are used.

Tbe hand-wheel at tbe side of the lower end raises and lowers the upper part of the frame, carrying the table and belt to get the desired inclination of the belt. This can be done while the machine is in operation, and all wedges, etc., are dispensed with.

On the central longitudinal shaft under the table is a bevel gear wheel which operates a cone pulley, and this in turn, by means of a link chain, operates an oppositely set cone pulley. A sprocket wheel on the end of the sbaft of the upper pulley runs the large sprocket wbeel, sbown on the side of the machine, and a chain connected with the shaft of this large wheel turns the upper belt-roller and gives nothing to the belt. The object of this portion of the mechanism, is to admit of the side and end shake of the table and belt, and admit of regulating the speed of the belt without interfering with any of the other operating parts.

By suitably shifting the link chain connecting the two oppositely set corrngated cone pulleys, the speed of the belt, through this intermediate mechanism, is regulated while the machine is in motion.

On tbe end of the first or lower cone pulley-shaft is another sprocket wheel, and a chain leading from this gives motion to the revolving agitator in the feed-box. This feed-box is really an amalgamator being lined with amalgamated copper plates and having the blades of the revolving agitator similarly prepared. At the outlet where the pulp is spread on to the belt is an apron also provided with a silvered plate the clear water is delivered to the belt hy suitable pipes near the upper end of tbe belt.

The upper roller carrying the helt revolves in a trough inclined from both sides toward the center where there is a discharge hole through which the concentrates are carried off by gravity and led where most convenient. This discharge of sulphurets is continuous.

It will be noticed that there is no strain on tbe belt since it forms no part of the motive power, being run independently of the otber mechanism. The power being applied to the npper roller only, the belt need not be very tight but can run slack if desired. The bevel grooves on the rollers keep it in line, the edge ropes fitting snugly in these grooves. Tbe combination of motions and the percussion prevent tbe banking of sulphurets which in some machines cause trouble. Nor can the belt cause annoyance by running off.

The canvas belt will run eight or ten months, and only costs about $15 to renew. Rubber belts will be furnished to those who prefer them, but it is claimed that closer work can be done with tbe canvas. The various adjustments are qnickly applied, and it does not need a skilled expert to manage them. It is stated that with tbe application of the end percnssion the sulphurets will gain about eight inches on the length of the belt in its run.

Tbis machine has a daily capacity of about ten tons, and it is claimed by the manufacturers that it only takes a tenth of a horse power to operate one. This is due to the use of tbe steel balls and the peculiar mechanism. It can readily be put in motion by the application of the finger to the balance wheel on the main shaft, as was proven by trial. One man may attend to half a dozen of these concentrators. Sulphurets saved by this machine were sbown to tbe writer, wbich readily pass through a 200-mesh screen. Some results of the work of this concentrator on the ores of Igo, Shasta county, are given in our advertising columns. These particular ores have heretofore been found very difficult to concentrate, but in this instance a saving of 94½ per cent has been shown. A number of machines are now in course of construction at the sbops of the company in this city.

Foundry Notes.

In an interview with a representative of the Joshua Hendy Machine Works of No. 51 Fremont street, this city, we were informed that those works have recently furnished a complete stamp mill for the Kate Hayes Mining Company of French Corral, Nevada county, of which Mr. Henry Pichoir is the secretary; and as well a complete 20-stamp mill, with steam power, has been built for the Golden Cross Mining and Milling Company of Los Angeles, California, witb rock-breaker, Challenge ore-feeders, etc. Also a 10-stamp mill, complete in every particular, for the Mascot Mining Company, to be erected near Oroville, in Butte county, California. They have also furnished a large amount of Tee-rail for several mining companies and for other enterprises.

These works make a specialty of huilding the Davis horse-whims, ore-buckets and mining cars, and have furnished a large number of each during the last two months. Among other of the specialties they huild and furnish are hydraulic giants, water gates and all of the accessories of hydraulic mining plants, and it is to be noted that whilst the hydraulic miners of California are "backward in coming forward" in planning their future operations under the provisions of the Caminetti law of Congress and the Ford law passed hy the Legislature of our State, and that the "debris question" is atill an unsolved problem, that many orders for hydraulic mining plants are being received from British Columbia.

We are further informed that the demand for the Buffalo duplex steam-pumps, and as well for water-pipe for farm, dairy and irrigating purposes, has been good and tbat large quantities of pipe have been shipped.

INSURANCE AND MINING.—A dispatch from Salt Lake says: It has been discovered by a prominent mining man that insurance companies have decided to withdraw from the mining camps of the West. Representatives of all the insurance companies in Utah were seen here and admitted that nearly all companies were refusing to renew policies on mining property and in mining camps. The decline in the value of the properties on account of the silver panic is given as the cause.

IT is probable that the early assembling of Congress will interfere with the trip of the Senate sub-committee on commerce to the Pacific coast on the deep-water harbor project. Senator Ransom, chairman of the committee, says that he hardly thought he and his associates could make the trip this season. An engagement prevented an early departure, and now the coming together of Congress has seriously interfered with the plans of everybody connected with Congressional life.

EXTENSIVE preparations are being made for the California Midwinter Fair, and subscriptions are coming in fast enough to warrant the belief that it will be a success. A site for the buildings, etc., has been chosen in Golden Gate Park.

W. B. RISING, Professor of Chemistry at the University of California, has been appointed to serve as a judge in the Department of Chemical Industry at the World's Columbian Exposition.

WM. IRELAN JR., who was superintendent of the California mining exhibit at Chicago, has resigned the position, to accept that of judge in the Department of Mines and Mining.

SOME of the Salt Lake men are storing the silver ore they receive, charging only for loading and unloading. Nothing will be done with the ore for the present.

Coast Industrial Notes.

THE Virginia *Chronicle* says that owing to the continued drop in the price of silver, the mines of Gold Hill have been compelled to partially snspend operations.

ALL stationary engineers are requested to keep away from Hailey, Idaho, where trouble exists between owners of one of the largest mines in that locality and the pumpmen and engineers.

SALT WATER is now being furnished from the baths at the West End for street-sprinkling in the city of Alameda. It is expected that the city will save over $500 a month on this method of laying the dust.

SILVER MINING has been discontinued everywhere. As but few mines have been operating in Inyo county of late, Inyo will feel the depression less than many other sections. The stoppage of work, however, will he seriously felt.

THERE are several old Comstock miners from Virginia City working in the Jerome mines of Arizona, and they all agree that the Comstock, in its most palmy days, was not equal to the Jerome mines, either in richness or extent of ore deposits.

A PRIVATE LETTER received at Tuscarora from Silver City, Idaho, states that all the mines there, with bnt one exception, had shut down in consequence of the low price of silver. The crowd who left Tuscarora a week ago for that place in search of work, will be greatly disappointed.

THE total expense of maintaining tbe electric light plant in Alameda last year was $10,941. The question which has been agitating the citizens for some time has been settled by the City Trustee. The city will not sell the electric light plant, but will still maintain it as in the past.

THE entire water front at Mare Island will be dredged within the next few months. Twenty thousand dollars will be expended for this purpose. A mud-dredger is badly needed at the island and in the course of a few years would be made to pay for itself, besides being available at all times.

THERE has been no improvement noted during the past few days in the run of salmon on the Columbia. From estimates obtained from the most reliable sources the pack on the 1st of the present month was from 75,000 to 80,000 short. Ten of the canneries have run half-time during the past two weeks.

A NEW naphtha schooner, built for Ross & Hewlett, tbe commission merchants, will be launched from the ways in Alameda early next week. The new craft is sixty feet long, sixteen feet wide, and is expected tosteam faster than eight knots an hour. She will be placed in the dairy trade between this city and Fort Ross.

THE Usal Lumber Company, at Westport, having beretofore paid its employes in sight checks, have adopted, in conjunction with all the redwood mill owners in Mendocino county, the system of paying in 60-day sight orders drawn upon a San Francisco firm. Their employes objected to that method of payment and have all quietly walked out.

THERE is evidently a disposition to put new life into the San Mateo Electric Railway It is said to be a very paying road, but its management, it is claimed, has not been as effective as it should be. The creditors have held many meetings to discuss the best means whereby the company's debts may be liquidated and the park branch of the road completed.

THE Southern Pacific Company struck a big flow in an artesian well Tuesday at Indio, near the botel. The capacity of the well is 4000 gallons per hour, and the water rises ten feet above the surface of the ground. The water was found at a depth of 500 feet. This well can irrigate quite a large tract of land and the company is jubilant over its success.

ONE of the ways to restore confidence in financial circles in the United States is to open the hydraulic mines of California Not only would their yield of gold help to supply the lack of gold in the country, but it would be the cause of millions of dollars of foreign gold being sent to this country to be used in the development of mining property.—*Colfax Sentinel.*

THE order came to-day for a reduction of wages all around in the mines of the P. C. Co. The men have refused to accept the new scale and the Yuba night shift have quit. The proposed new scale is as follows: Carmen $2.25 per day, miners $2 50, timbermen and engineers $3. This affects about fifteen men, hut it is thought the day shift will follow suit.—*Pioche Lode.*

ARTICLES of incorporation of the Mount Vernon Water and Power Company have been filed in San Bernardino county. The incorporators are John L. Campbell, H. B. Muscott, C. W. Allen, E. E. Rowell and Hattie L. Campbell. The capital stock is $52,500. The object of the incorporation is to purchase water and water rights for manufacturing and domestic pnrposes.

THE public schoolhouse at Monterey, erected last year at a cost of $20,000, together with the fine library, was burnt to the ground last week. The fire was undoubtedly of incendiary origin. The insurance on the building and contents, amounting to $12,000, will hardly enable the school district to begin the erection of a new schoolhonse, and the loss sustained in the library is irreparable.

AT a large and enthusiastic mass meeting, held in the town of Anderson, the center of the fruit interests in Shasta county, a resolution was adopted agreeing to exhibit the products of this community at the mid-winter fair, to be held in San Francisco. It was also resolved to use the best efforts of this community to secure the exhibit of the united interests of Shasta county.

THE decline in silver has stagnated the ore market. Smelters decline to bid on ore, and are taking only what they are obliged to take under contracts. Quotations of any kind are nominal even for lead ores. The result is

mine owners are restricting production, or ceasing entirely. The camps are full of idle men, for whom there is no work at any price, and the financial pinch is felt over the entire State.—*Mining Industry.*

EVERY indication points to the prospect of there being considerable work during the next year at Mare Island Navy Yard. The Congressional delegation from California have made several visits to the yard recently, with the view of ascertainiog exactly what is required and to fully understand the requirements, so that when they go to Washington they will be in a position to explain what is needed. The various officers in charge of departments have accorded the delegation all the information possible.

ADVICES from Goff's on the Atlantic and Pacific road state that the contractors who are laying the track for the Nevada Southern from that point to Good Springs are rushing matters. The road is now running within five miles of Vanderbilt. The latest and most important information concerning the new road is that the contract for building fifty-one miles of new road between Vanderbilt and Good Springs will be let on the 20th inst. This indicates that the line is not to be a branch of the Santa Fe system, but an independent trans-continental line connecting Denver and southern California by way of San Bernardino. Some hold the opinion, however, that the road is to connect at Clover Valley junction, south of Pioche, Nev., to which point the road from Salt Lake now runs.

OVER in the Highland country, Montana, a large number of miners are engaged in prospecting for gold ores and every day from one to half a dozen men leave Butte for that section. The depreciation in the silver market has turned the attention of prospectors to gold and the Highland country is one of the most promising in the vicinity of Butte. The belief is very general that all the surface deposits of gold found on Silver Bow and Moose creeks were washed ages and ages since from rich quartz leads on the Highland. For twenty-five years the search for these rich leads has been prosecuted each year and although rich bunches of ore have been uncovered the prospectors believe that the mother lead has not yet been found. Prospecting can only be carried on in these mountains during July and August, on account of the depth of the snow.

THERE is a vast improvement in the present condition of affairs at the Mare Island Navy Yard as compared with last year or any previous year. In all departments there is great activity. In the steam engineering department there is a large force of machinists. Their labors are given to the construction of the triple expansion engines designed for the monitor Monadnock. In the joiners' shop also great activity could be seen were the doors open to the public, but secrecy reigns, for here upon the floor is drawn the deck specifications of the Monadnock. In the boat shops several boatbuilders are modeling and shaping the boats of the Monadnock. Here are employed the most skillful boatbuilders to be found, as has been evidenced by the record of the boats of the San Francisco. In this shop were found six boats under construction, while there were many others completed. At the smitheries and shipfitting machine shops fully 200 skilled machinists are at work. A visit was made to the Monadnock, which lies at the quay wall, for the purpose of inspecting her interior. The boilers are all in place and the connections are made. The fireroom is practically ready for service.

AT A MEETING of the San Francisco Clearing-house held recently the following preamble and resolution were unanimously adopted and ordered printed, to be distributed to all concerned:

WHEREAS, It is universally admitted that the allowance of overdrafts of banks is an unwise system of banking as compared with the more conservative system which enables the banker to retain control of his resources at all times, and whereas the banks of this association did on July 6, 1893, unite in a written agreement to abandon the allowance of current overdraft accounts at bank; therefore

Resolved, By the San Francisco Clearing-house that the banks of this association will, in accordance with their said agreement, annul all overdraft privileges and promptly notify their customers that overdrafts will not be allowed, and also that the Clearing-house banks will in all fairness support each other in carrying out this resolution in letter and in spirit.

Attest: J. S. HUTCHINSON, Sec.

The following banks compose the San Francisco Clearing-house: The Bank of California, the Bank of British Columbia, the Donohoe-Kelly Banking Company, the First National Bank of San Francisco, London and San Francisco Bank (Limited), Sather Banking Company, the Anglo-California Bank (Limited), Wells, Fargo & Co., the Nevada Bank of San Francisco, London, Paris and American Bank (Limited), Tallant Banking Company, the Crocker-Woolworth National Bank, Grangers' Bank of California, American Bank and Trust Company, Bank of Sisson, Crocker & Co.

J. McKee, president of the San Francisco Clearing-house, in reply to a question, said: "The system of overdrafts is allowed in no other commercial center of the world. It is an unsafe way of doing business, as it does not allow a banker to keep control of his resources, and it is better for customer and banker alike that the system should be abandoned. The agreement of the Clearing-house is, in my mind, the most important step it had taken since its commencement. In future under the new arrangement all business accommodations at a bank must be preceded by negotiations for the amount needed."

Coinage Charges for Silver and Gold.

TO THE EDITOR:—Was gold coined by the United States with a charge for coinage previous to 1873? If so, what charge?

Was silver coined by the United States previous to 1873 with charge for coinage? Very respectfully,

Durango, Col., June 27, 1893. SUBSCRIBER.

[The coinage charge for gold from 1853 to 1871 was one-half of one per cent. From 1871 to 1873 it was one-fifth of one per cent. Since 1873 there has been no coinage charge.

From 1792 to 1853 there was no coinage charge for silver. From 1853 to 1873 there was a coinage charge imposed.—EDITOR.]

Not a "Kid-Glove" Miner.

TO THE EDITOR:—In the Marysville *Democrat* of the 26th of June, 1893, was an editorial which had for its headline "NOT CORRECTLY STATED," and that was true. The editor's criticisms are not "*not correctly stated.*" The interview with me printed in the San Francisco *Call*, to which he alludes, was a statement of facts, no matter if these facts were displeasing to the *Democrat;* but as I am only a "clerk," I will not attempt an argument with an editor of a daily journal.

I have the honor to be the Secretary of the California Miners' Association, having served in that position for two years, and confess that I feel very proud of being chosen by such an assemblage of whole-souled, open-hearted, liberal-minded men as the miners of California who attended both of the conventions in this city. The gentleman says in his article that I am a "kid-glove miner." That may be so according to his ideas; but if swinging a single-hand hammer, polishing the head of a drill, piping in a hydraulic pit, sharpening drills, afterwards acting as foreman and later on as superintendent of a mine for nine years, makes one a "kid-glove miner," will you kindly tell me what constitutes any other kind of a miner?

That I am "one of the class of men who have done the miners more harm than benefit," I emphatically deny. It has been my earnest endeavor to assist in an humble way in the solution of the problem of permitting the hydraulic mines to resume work without materially damaging the navigable streams. My labors may have resulted in no great good; but that I have done the miners of California any harm I deny and will not so believe until the miners themselves tell me so. Nine years ago I published a weekly paper called the *Mining and Industrial Advocate.* Hon. E. G. Waite, the present Secretary of State, was my editor. Its purpose was to promote the mining industry of the State. The money spent by me in that venture was certainly not with a view to "harming the miners of California," nor was the time lost anything to my advantage. The gentleman states in his article that I do not know what I am saying. Incompetence is scarcely a subject for discussion in this instance, for I am only a "clerk" and the gentleman is an editor with a daily paper at his command. He has a perfect right to think of me as he pleases in regard to knowledge and I will gracefully submit, for if a man is drawn into a controversy with everyone who considers him wanting in ability, he will have a never-ending war of words.

Some statements made by me I know do not meet with the approval of the Anti-Debris Association or of its ally, the *Democrat*, but that is immaterial to me. The miners have been a law-abiding set of men. They have stood more than any other class of men in the world would under similar conditions. They bought their land in good faith from the United States Government, and I contend are entitled to more consideration than they have received in the past ten years.

My father was a miner. He made his money mining in California and Nevada, and he raised his sons to become miners. I am happy and proud to say that to-morrow I could go underground with the boys and put in a good 10-hour shift. Some of the happiest years of my life were spent in mining camps in Placer county. Mining has been my business and will continue to be for the rest of my life. I look upon miners as men full of courage, warm-hearted, liberal to a fault, and true friends. They have been my friends, and I will ever try to repay them in my humble way for the kindness they have shown me.

Yours respectfully, W. C. RALSTON.

San Francisco, July 12, 1893.

Mines Around San Bernardino Mountain.

TO THE EDITOR:—I have lately been visiting the mines in and about San Bernardino mountain and find considerable activity. The old Gold Mountain (Lucky Baldwin) mines have been bonded by Budd Doble and associates, and a company is being formed to be called The Budd Doble Gold Milling and Mining Co.

It was a well understood fact that the quantity of ore and the values were in those mines. It appears that Doble has for years past been testing these ores in Denver, Chicago, and other mining centers and always found the assays satisfactory, but never until lately could he find proper treatment for saving the gold. Hearing of the new patent amalgamator of T. J. Lovett's, of Chicago, the machinery of which is manufactured by The Gates Iron Works, Doble and associates had Mr. Lovett visit the property and after satisfying himself as to the quantity and quality of the ores, had a few tons shipped to Chicago for a practical test. The new machinery saved 90 per cent—this being highly satisfactory—and to further assure themselves they had a couple of mills put up on the ground. One of the mills has been in operation for over a month and the mines have been opened up where there is a mountain of ore, if I can use such a term. A face 40 feet in width by about the same in height is now in full view where they have taken the ore from to test the property. I have seen the results of several assays of tailings and in no instance do they exceed $1 per ton. This is extremely satisfactory and the result of the clean-up is more surprising. Your correspondent has been allowed, through the courtesy of Mr. Lovett and Mr. Jenks, the metallurgist, to be present during the time they have been cleaning up and smelting. I give you the exact figures, which will no doubt surprise some of the old Gold Mountain Co. stockholders and especially Lucky Baldwin himself.

The ore taken from the face of the 40 feet assayed $10 per ton, and the actual bullion saved was $9.10. This is highly satisfactory, and Mr. Lovett will soon go East for the purpose of putting in a large plant.

The Rose mine, in Morongo district, about six miles east of the Gold mountain, is still running the five-stamp mill with success, and the company (being composed principally of orange-growers in Riverside) is also shipping some of the rich ores to the smelter. This mine has been running some two years with remarkable success. The ore is high grade, being about $50 per ton, and the shipping ore over $300 per ton. The mill process will save only a small percentage of the higher grade—in fact, they do not save over 60 per cent of any of the ore. Mr. Wood, formerly of Tombstone, is now in charge. The last ore-body has been struck on the 350-foot level, and it is the largest body yet found. If this mine was up north there would be a great deal more heard about it.

The Holcomb Valley Co. is putting in new machinery on its placer ground. Mr. W. E. Pedley, the superintendent, believes he has now surmounted the difficulty of working the ground. The gravel is rich enough, but the natural fall of the ground is not sufficient for sluicing or hydraulicking, so he is putting up expensive dredging machinery, with a view of getting sufficient fall for sluicing. The works are expected to be in operation in a few weeks.

C. W. Allen, of San Bernardino, is working several men on the Livingston mine. Some old works have been cleaned out to the depth of 200 feet, where he expects to work the mine from. Some very rich ore has been struck lately, and by cross-cutting from the bottom of the old shaft they expect to strike it at that depth. This claim is about five miles southeast from the Rose, in the main belt. A number of prospects in Rattlesnake canyon, in the same neighborhood, give promises of value.

This country (Bear valley) as a summer resort cannot be surpassed. There are two lakes, one five miles in length, which supply Redlands and surrounding country with their irrigating water. This is a most picturesque sheet of water, the tall pines surrounding it on all sides. There are lovely drives, good fishing and hunting, and the best of accommodation. The stage runs twice a week from San Bernardino to Knight's hotel, in Bear valley. MORE ANON.

Pine Lake, San Bernardino Co., July 10, 1893.

The Mining Bureau Museum.

The following are among the recent additions to the mineral collection of the California State Mining Bureau:

Galena Crystals in fossil oyster shell—Leadville, Colorado; from J. Z. Davis.

Gold in Hematite—Our Flag Mine, Calaveres Co., Cal.; T. H. McArdle.

Tantalite and Columbite—King's Creek District, Fresno Co., Cal.; R. Reynolds,

Boleite—Boleo, Lower Cal.; from the Compañia del Boleo and from Dr. Hoerdell.

Josephinite—Josephine Co., Oregon; from Jas. H. Scott, Judge W. K. Hanna and Will Q. Brown.

Auriferous Blue Gravel—showing free gold from a channel near Yreka, Siskiyou Co., Cal.; C. B. Gilson.

Suite of Ores from the Boleo Copper Mines, Lower California; from the Compañia del Boleo.

Stibnite—Caliente, Kern Co., Cal.; Sumner & Brown.

Gold Quartz—Reed Con. Mine, Shasta Co., Cal, assaying $522.00 gold and 25 oz. silver per ton; R. Stevenson, manager.

Fine Specimens of Native Copper, Feldspar, Crystals, Topaz, etc.; from the Geological Survey of Japan.

Tellurium, Tellurides, Silver Minerals and a variety of Silicates; from the School of Mines, Golden, Colorado.

Zaratite—Madera, Fresno Co., Cal.; James Brusie.

Platinum and Platiniferous Earths, from the Demidoff Estate, Nijoi, Ural Mountains, Russia; from Mr. Geo. F. Kunz.

Green Tourmaline—Auburn, Maine.

Gold Quartz—Gold Bronze Mine, Vanderbilt District, San Bernardino Co., Cal. Assays 15 ounces gold and 60 ounces silver per ton; from Messrs. Faggart & Hall.

Silver Ore with Bismuth, Gold, Copper, Zinc and Antimony; Mariposa Mine, Sinaloa, Mexico; H. W. Faust.

Silver Ore—Very rich, with Embolite and Ceraragyrite in crystals. Fame Mine, Globe District, Arizona; Alfred Haustein.

"Peacock Copper Ore"—500 foot level of the Union Mine, Copperopolis, Calaveras Co., Cal.; G. McM. Ross, manager.

Crystalized Gold—Dry Gulch Mine, El Dorado Co., Cal.; J. J. Crawford.

Atacamite, Proustite, Ruby, Silver, Etc.—Six Specimens, Chile: from the Sociedad Nacional de Mineria de Chile, per C. T. Ward, Jr.

Cosaltite—Candameña, Chihuahua, Mexico; Ross E. Browne.

Cobalite—Alta, Placer Co., Cal.; W. F. Drew.

Native Lead—Red Elephant Mine, Idaho; Geo. Garbutt.

Gold Quartz with free gold—From the famous Drum Lummon Mine, Montana; Geo. Garbutt.

Cinnabar—McCarthy Mine, Sao Francisco City.

Gold in Calcite—E. D. M. Mine, Quartz Valley, Siskiyou Co.; A. G. Myers.

Danaite—Josephine Mine, Mariposa Co., Cal. A number of specimens of gold quartz from mines in Mariposa County, not previously represented in the Bureau collection.

Natural Coke—Pagosa Springs, Archuleta Co., Colorado; E. M. Railton.

And a large number of other specimens, models, views, etc., of interest.

Pocket Mining.

NUMBER II.

TO THE EDITOR:—A pocket, as stated in the first article upon this subject, is a concentrated body of gold, silver or other valuable mineral occurring in certain spots in ledges, lodes, veins, etc., of quartz and mineral-bearing rock. Gold pockets, upon which this series of articles is written exclusively, occur only in quartz or where quartz is present, for it is now known to be a proven fact that without quartz being present in some form gold does not exist in its original lodging place, where it has been precipitated from solution, or, in other words, congealed or transformed from a liquid state to a solid metallic state. Minerals exist in three physical conditions, viz., solid, liquid and gaseous. It is well said that "quartz is the mother gold," for it is always found with the gold. The gold is carried with the mineral quartz—for quartz is a mineral—in solution into cracks or fissures formed from various causes in the earth's crust, and there the solution becomes solidified from some peculiar action of nature and becomes what we term a ledge or vein. Now the question naturally arises, where does this mineral solution which comes in and forms veins in those cracks or fissures originate or come from? It comes from the formation or earth in which they are diffused, in the vicinity of where the mineral-bearing vein is formed. Those minerals being distributed throughout the formation in which they exist, are liberated gradually, mostly in a gaseous form, and are taken up by the water and transformed into solution and carried to those cracks and fissures and other lodging places, where they again undergo a change and are transformed into a solid state and form our mineral bearing veins or deposits. In nearly all the districts on this coast the mineral-bearing veins or ledges that run parallel with the formation of the country rock are almost invariably what is commonly called milling ledges, because they carry about the same amount of mineral all through the pay chutes, while on the contrary all the ledges that run crosswise of or cut the formation are pocket ledges. The pocket belts, or streaks of formation which are prolific in pockets, are mostly porphyry or of a porphyritic or quartz-porphyry nature running parallel with the slate, granite, lime, etc., and are readily detected by the professional and experienced prospector owing to the chemical and mineral composition and general appearance to the eye. This pockety formation does not always exist in belts, but sometimes occurs in spots or patches throughout the mineral belts of the coast. In fact, there is hardly a mineral district west of the Rockies in which those spots do not occur. The chemical or mineral composition of this pocket formation is generally silica, lime, soda, alumina, potash, copper, lead, magnesia, iron, gold, quartz and water, although these conditions differ in each locality. What forms the pocket, or, in other words, what causes the gold to concentrate in a small space at certain points, is owing to a peculiar combination of other minerals which exist at or near that point and form a magnet, as it were, and some of the minerals in this peculiar combination having an affinity for each other naturally concentrate and in turn combine to form an affinity or attraction for the others contained in the same formation, and so on until the combination is complete and possesses the affinity for the gold, quartz and other lateral properties. What those minerals are and how to detect them, and a thorough explanation of my theories and the *facts* upon which they are based, will be given in future articles of this series. Pockets occur in three distinct and different conditions, viz., decomposed or free pockets, intact or specimen-rock pockets and pay-chute pockets, and they each form from separate causes and under different conditions.

The first, decomposed or free pockets, occur upon ledges, seams, feeders, etc., and are generally near the surface and throw out a strong trace, and as a rule are easily found. Those pockets are generally small compared with the specimen-rock or intact pockets and rarely exceed over $2000. At the point where the pocket occurs in the ledge or seam the combination of minerals at that point decomposes the ledge and leaves the gold free so that it can be panned out, and often it is so well freed from the quartz, iron and other minerals that it does not require crushing in a mortar to make it salable as free dust. In this class of pockets there is always another cross seam or ledge which cuts, crosses or comes in contact with the ledge or seam at the point where the pocket occurs.

This cross or contact ledge or seam always carries or is entirely composed of a different mineral from that which predominates in the ledge which contains the pocket and is often very small, sometimes not more than a fourth of an inch in thickness. This ledge or seam which is composed of or carries the mineral that is required to complete the combination which decomposes the ledge at the pockets and causes the pocket to form at the point where it comes in contact, always runs at an angle to the general course of the main ledge. There is always a feeder or loose place from the pockets of this class to the surface of the ground somewhat resembling an old gopher or squirrel hole which has settled or caved in, and through this aperture or feeder the gold is forced out to the surface of the ground by the action of gas generated in the pocket; or the gold is forced from the pocket in a gaseous form and becomes condensed as it passes through this opening or feeder and when it comes in contact with the atmosphere. By either action it reaches the surface of the ground, and by its specific gravity it naturally works down hill. There are invariably two of those feeders or "spire holes," as the pocket hunters call them, one leading up and the other down the hill in a curving course from the pocket to the surface. This accounts for gold being often found plentifully as much as 25 feet and over above the pocket, when it occurs on hillsides, which very often misleads the prospector and causes him to pass over the pocket and miss it entirely.

The trace from a free or decomposed pocket is always on the top of the ground, in the grass roots as it is termed, and rarely if ever is found down any depth in the soil unless it be of a very loose nature so that the gold can readily sink down into it. But if the soil be firm and compact and the hill or mountain side steep, the biggest prospect will be obtained by scraping the loose dirt and gravel on top down, say an inch, to where the ground is hard and compact, for very little of the gold will work down into the solid ground if it has any chance at all to work down hill. I have panned on traces where other prospectors, who were in the habit of going down to bedrock for their dirt to pan, had worked, and where they could not raise a color on bedrock where the soil was not more than 14 inches deep, I have got as high as 25 cents to the panful taking the loose dirt on top of the ground.

It may be well to explain what a pocket trace is, for the benefit of the novice and those who are inexperienced. A pocket trace is the gold and other minerals which are liberated or forced out from the pocket and by their specific gravity gradually work down hill, naturally spreading out over the surface more or less in its downward course, until it finds its level or works into some gulch or ravine. In the case of pockets of this class which have been capped over by slides and locked up, as it were, from longer giving a trace, or where a great space of time has elapsed since the gaseous action ceased to throw out the gold from the pocket, the gold in the course of time works down into the soil and finally reaches bedrock. But in the majority of cases the gold and the mineral that comes with it from the pocket are in the surface dirt.

I invite the criticism of *practical* experts on this subject whose theories, views and experience differ from mine, so that the different theories and views expressed upon this most important branch of mining may result to the general good of all the miners and prospectors on the coast, and especially to the readers of the MINING AND SCIENTIFIC PRESS.

ALEX QUARTZ.

Of Hydraulic Mining.

TO THE EDITOR:—The present condition of this great industry is lamentable. A few years ago we saw a steady stream of ten or twelve million dollars in gold pouring into the coffers of the mine-owners. Now, what do we see? Mines shut down, rivers choked and valleys overflowed! And yet the State has need of every ounce of gold that can be procured, and the tule lands need all the slickens the mines can make. It is simply a case of matter in the wrong place. In the river, nature has provided a flume by which to convey the slickens to the tules. All that is needed is to take the slickens out of the river and dump it where required. There is a dredge now at work in England which can get away with 4000 tons an hour. Let the hydraulic miners combine and set half a dozen such dredgers at work in the Sacramento river. Within six months the mines will be running and the miners will be accounted the best friends of the farmers. Moreover, at present quotations for silver, gold is worth double what it was 20 years ago.

"VERB SAP."

San Francisco, July 10, 1893.

GOLD IN A SWAMP.—The latest gold reefing discovery is at Euahalong, on the Lachlan, New South Wales. One of the owners of the station, plowing in a mulga swamp, with the view to forming a furrow in which to lay poisoned wheat for rabbits, turned up a block of quartz. Curiosity made him pick it up, and he saw gold in it. The whole of the flat was covered with alluvial deposit, and the owner decided, when he had leisure, to sink beneath where he turned up the quartz, though there was not the faintest indication of an outcrop. After sinking about four feet through the alluvium he came on to a body of quartz four feet wide. A shaft has now been sunk to 82 feet. The reef has been proved at 30 feet and at 50 feet, crushings of five tons from the former level going 5½ oz., and at 50 feet 1 oz. 11 dwt. A drive is now being put in to cut the reef at 82 feet. The discovery is one of those accidents which beat fiction.

LAKE SUPERIOR MINES.—A suspension of work has been ordered at some of the Lake Superior mines, among them the big Norrie mine which has been working a half force of 650 men. These have been let off, and other mines around Ishpeming have ceased operations for a time, and additional ones will close at the end of this week. The unfavorable outlook in the ore business in regard to prices is the cause of the shut-down. Large stocks are on hand, and shipments will be made from these.—American Manufacturer, June 30th.

A SLIDING SCALE.—The mining outlook in the silver camps on the Wood river, Idaho, is very dull. Two or three of the principal mines are still working under a sliding scale of wages. The Red Elephant has an agreement with the men by which they are to receive $3.50 a day when silver is 85 cents or over, $3 when between 80 and 85 cents, $2.50 when the price is between 70 and 80 cents, and $2 when between 50 and 70 cents. Should silver fall below 50 cents, the mines are to be closed down. The Red Cloud has a similar arrangement with the miners.

THE Highland Irrigation Company has completed a reservoir ten miles from San Diego with a capacity of 1,500,000 gallons, which will be filled by a pump having a capacity of 1,000,000 gallons daily. Upward of 2000 acres of land will be irrigated and pipes are now being laid. The company will soon build another reservoir a few miles from the present one, with a larger capacity, to irrigate 3500 acres more.

NEAR the new stone drydock at Mare Island Navy Yard excavations are being made for foundations for the new benching rolls. From appearance the beds will be of sufficient strength to bear the greatest weights that they can ever be subjected to. Buildings will soon be erected over them.

A Gold Shipment.

The Mechanical Operations of Packing and Exporting the Coin.

When a foreign banking house announces that it will ship $1,000,000 in gold to Europe, the mechanical operation of making the shipment is interesting. The house reaches its conclusion to ship after finding that it has sold its own bills of credit to importers of goods to such an extent that it cannot buy enough bills from exporters of merchandise, etc., to cover the amount paid out by it to the importers.

At the present time a banking house will pay exporters of merchandise as high as $4.89 to the pound sterling for a demand bill of exchange on London; but to pay any higher price is not as profitable as to ship gold. That condition exists at the present time. Not being able to get the bills wanted at $4.89 to the pound sterling, the house decides to ship gold.

The questions to be decided now are how to get the gold and how to get it to its destination securely. First of all, the house sends its manager to its bank and informs it of the contemplated shipment of gold, so as to prepare it for so large a payment. The house then deposits with the bank checks to the amount of $1,000,000, which it has received from importers in the transaction of business over the counter. These checks the bank sends to the clearing house for collection. The clearing house collects the money from the different banks upon which the checks are drawn.

It is important to notice that the money which the clearing house takes at the present time from banks is principally greenbacks, gold certificates, treasury notes of 1890 and national bank notes. There is more or less discrimination against silver certificates because these are not legal tenders.

The bank which is to furnish the money for the exporter of gold notifies the clearing house to pay it such bills as will be received by the sub-treasury in exchange for gold. The bank adopts this means of getting the gold for its customer rather than to give it directly from its vaults. At the present time the bank in question wants gold certificates and legal tenders, because this form of currency is the surest to get the gold from the sub-treasury, owing to the fact that the Government stock of gold is reduced to a point where more or less discrimination must be exercised in regard to the different forms of currency taken in exchange for gold.

The clearing house, in answer to the bank's request, tries to accommodate it with the currency it wants, but cannot go beyond a certain point in favoring it, because all the other banks in the clearing house may desire equal accommodations, although this at present is not strictly the case. At any rate, the bank gets a large proportion of greenbacks, say 60 per cent, the balance being given in treasury notes of 1890, and perhaps a very few gold certificates.

After the bank has received this money from the clearing house it notifies its customer, the foreign banking house, that it has the money on hand subject to its order. The house then sends its clerk to the bank with an attendant and a large valise, and gets from the bank the million dollars in the forms of currency indicated. This clerk and his attendant return with this money to their house, where it is recounted. Afterward the manager of the house with an attendant, as a safeguard, takes this money in a valise to the sub-treasury and presents it to the cashier, stating that it is his wish to get $1,000,000 in gold coin in exchange for this paper money for export.

The cashier of the sub-treasury receives the money, and again it is counted. The cashier on finding the counting correct looks over the different kinds of coins in store, and gives the house a certain proportion of the double eagles, eagles and half eagles, according to the amount of each kind held by the sub-treasury. The house must know approximately, before it decides to ship, just what kinds of coin will be given, because the smaller the coin the greater the abrasion in handling it, and that must be taken into account in estimating the expense.

Therefore, while the employees at the sub-treasury are counting the money deposited by the house, the manager of the house receives from the cashier of the sub-treasury an exact statement of the kind of gold he can give and what he can do in preparing it for shipment. Assuming that the estimated loss from probable abrasion and expense of packing, etc., can be afforded, the house orders $1,000,000 of the coins to be put up for shipment. The sub-treasury then puts the coin in canvas bags, each holding $5000, and puts these bags in kegs, each keg containing $50,000, and each keg tightly fastened. For this, of course, the sub-treasury makes a small charge.

When the kegs are ready the house sends a duly authorized drayman to take the gold to the steamer. During this time also the house consults the insurance company about insuring the gold while on passage. The whole time occupied from the point of deciding to ship to the actual placing of the gold on board the steamer is about 40 hours, sometimes more, sometime less, according to the trouble involved in getting the proper currency from the bank, and the difficulties attending getting the gold from the sub-treasury. The various expenses of insurance, cartage, packing and freight amount to about one-fourth of one per cent.

While these details may seem insignificant and mechanical, there is, nevertheless, at each step an important risk involved, and the greatest care must be exercised in counting and calculating, and great confidence must be reposed in those to whom the task of executing these details is given.

Of course, the main point in a gold shipment is to determine the principal factors in the first place which will make the probable shipment a profitable one. These lie outside of the mechanical operations already enumerated. These factors include on a gold shipment to London, the rate of sterling exchange here, the discount rate in Lon-

dnn, the money rate here, and the weight of the gold. The mnney rates are important, because of the time the house must be without the money while it is on the ocean.

At present the gold shipped goes to Bremen and from there to Vienna. In this transaction not only the rate of sterling exchange on London must be known here, but also Paris, Vienna and Berlin. The banking house here, as a rule, depends upon its foreign house in Vlenna to figure out the profit on the gold shipment, because in Vlenna the banker is in better position to watch the various exchanges on London. The New York banker finds it too complicated, owing to rapidly changing conditions in the different cities of Europe, to figure with certainty.

To figure the profit on a shipment of $1,000,000 from New York to London is comparatively easy, and can be done by the New York banker. Previous to the present shipments the gold has been exported mostly to Paris. Even this shipment is a complicated one, so far as figuring out the profits is concerned, because of the different rates of exchange and the different money markets which must be consulted; but it can be done by bankers on this side in conjunction with their London and Paris correspondents.—New York Independent.

NEW MILITARY DEPARTMENT.—The President has signed an order reorganizing the Military Department of Arizona under the name of the Department of Colorado, with headquarters at Denver. The Department of Arizona consisted of the Territories of New Mexico and Arizona and that portion of California south of the 35th parallel. The new order abolishes the Department of Arizona and places Arizona, New Mexico, Utah and Colorado in the new department. California is restored to the Department of California, with headquarters at San Francisco. The headquarters of the Department of Arlzona were at Los Angeles, placing General McCook, commanding, at the extreme western part of his department. This caused great delay in communicating with army headquarters at Washington, as all matters in his section were sent to him, and by him to Washington. With the headquarters at Denver, he will be at the extreme east of the department and in the closest communication with Washington. This, it is believed, will effect economy in time and money and greatly facilitate the disbursement of supplies and ammunition. The move is not at all liked at Los Angeles, however, since it is worth a great deal to a town or city to have the headquarters of a military department established within its limits. A vast quantity of supplies are bought at headquarters for the use of the troops serving in the department. Forage, fuel, flour, pork, bacon, beans and many other articles are purchased annually, and the local contractors, bankers and commission merchants are very much benefited by having so good a cash customer as Uncle Sam at their own doors. It will not make much difference to San Francisco, which is certain to always be the headquarters of not only a department, but also a division. The recent change was made with a view of correcting the absurdity of having two army departments within the boundaries of one State. The Department of California, under the new arrangement, consists of the whole State, wlth Nevada thrown in.

ON July 1st the Denver, Salt Lake and San Francisco Railroad Company was incorporated under the laws of Colorado. It is capitalized at $10,000,000. It has for a prime mover and chief promoter Governor John Evans, president of the first railway ever built into Denver, who also organized and constructed the Denver, South Park and Pacific road, and the Denver, Fort Worth and Gulf railway. Most of the directors of the new company were interested with the Governor in the ventures named, and, all told, it is safe to say that they are worth $50,000,000. It is the intention of the company to at once put a corps of engineers in the field, and, when a most feasible route has been determined upon, commence work building the road.

THE naval reserves, when an opportunity occurs, will exercise at sea. It is not the desire of the Navy Department to follow the practice of drilling the men of the naval militia on shore and ships in the vicinity of their homes. It is believed that a better opportunity will be afforded the men to familiarize themselves with practical seamanship by sending them out of sight of land. As soon as a proper ship can be spared the reserves at San Francisco will probably be given an opportunity of sea life and drill.

GEORGE W. STARR, who for the past three or four years has been the efficient superintendent of the Empire mine of Grass Valley, has tendered his resignation to the Empire Company to take effect at once. Mr. Starr has accepted a position under John Hays Hammond to go to the rich gold fields of Johanneshurg in South Africa as superintendent of one or more of the big mines in that district, and expects to leave on the first of August. Mr. Fred De Crano will go to Africa at the same time.

TO DEVELOP SOUTHERN MINES.—Captain W. R. Perriman, representing the Ibarra Gold Mining Company, has chartered the schooner Amethyst to take a cargo of mining implements and machinery from San Francisco to Santo Domingo for the Ibarra mines. The vessel will load at once and clear for Ensenada. San Francisco purchasers of the Ibarra gold property are preparing to develop it on a large scale. They have plenty of cash, and competent men have been secured to handle it.

THE Mammoth mine in Pinal county, 50 miles from Tucson, A. T., has shut down. The Mammoth was a gold mine and belongs to a syndicate in London, England. It is believed that the suspension is only temporary. The yield for the past few months has been very low.

THE mill at Needles is receiving ore from both Vanderbilt and New York districts. There is talk of building a smelter at the Needles.

The Art of Mining by Fire.

In olden times, before the lnvention or common use of explosives, the best method available for mining through the hardest kind of rock, such as resisted the use of hammer and wedge, was by means of fire. Nothing is more natural than that the effect of fire on rocks should have been known at a very early period; no one who has lighted a fire on rock can help noticing the rending effect of the heat. The same thing would he seen after any natural forest fire; several examples on a very extensive scale have recently come under the writer's notice in Australia where bush fires of great extent are frequent, and all the rock cropping out at surface ls seen to be cracked and split over great areas. The great trouble with fire-setting seems always to have been the heat and smoke produced—the latter being often strongly snlphurous, where the ore contained pyrites or other sulphides. It is easy to see that this would have been a great obstacle, where the means of artificial ventilation were so imperfectly understood; but it applies far less at the present day. Indeed, by a proper system of ventilation with upcast and downcast shafts, it need be no more objectionable than the ventilating furnaces still used in some collieries; and at Kongsberg silver mine in Norway, the system is still used occasionally for drivlng levels, mainly on account of the great improvement in ventilation which it causes throughout the mine.

The writer has recently had an opportunity nf seeing the process at work in this mine, and as it is perhaps the only place of importance in Europe where it still survives, a few details of the mode of working may be of interest. The process is now confined to the occasional driving of levels in hard siliceous gneiss—it having been found that the micaschist and other micaceous rocks, which also occur at Kongsberg, are far less favorable for fire-setting. A short piece of level is driven at first in the ordinary manner, to get room to start the process; and wood—mainly logs of white fir and red pine, dry and split—is closely piled up so that the fire plays against the "face;" waste wood or old timbers from the mine being often piled against the freer-burning fir, to concentrate the heat. When the pile is lit smoke fills the level, and the men leave it, but in two or three hours it is generally burnt out, and as soon as the men can come in the broken stone which is split off is cleared away, and all that is sufficiently loose is broken down. The fire sets stronger on the roof and sides than on the sole, so that the levels have a constant tendency to slope upwards. This can partly be prevented by better arrangement of the fuel, putting long pieces at the bottom and covering the upper part; bnt sometlmes the sole has to be blasted. The ordinary speed of driving is from 5 feet to 20 feet per month. Prof. Helland states that fire-setting kept its place as the common method at Kongsberg so long as double-handed boring, iron borers, and powder were used; but that on the introduction of single-handed boring steel borers and dynamite or other high explosives, the use of the old method rapidly died out.

In 1864 fire-setting was both cheaper and quicker than the old method nf blasting with powder in large holes; but on the introduction of dynamite and small holes, things were entirely reversed; not only did the new method effect a great saving in time and cost, but fire-setting became actually dearer than before, owing to the increasing wages. It should be added that at Kongsburg suitable wood is very cheap—an important point, when it is remembered that about nine parts (by volume) of wood are required to one part of rock, and that much less skilled labor is employed for the fire-setting—as is indeed shown by the rate of wages paid. There seems to be little reason to believe that fire-setting is very unhealthy for the men employed, when care is taken to ensure efficient ventilation. No doubt the great heat developed is prejudicial; but perhaps not more so than the dynamite smoke, the constant jar to system ln heating the drill, and the fine sharp dust often inhaled, incidental to the more modern process.

Attempts have been made at various times to improve the fire-setting method, by using turf at the Rammelsberg mines in the Harz, and brown coal in the tln stock works at Altenberg; but neither was successful. Better results were obtained with coke at the St. Cristoph mine near Breitenbrunn in Saxony. At Felsobanya, in Hungary, the method is improved by the firewood being held in an iron framework on legs or wheels ("pregelkatze"), which concentrates the fire and improves the draught. According to Serlo, Hugon has used a small furnace, mounted on wheels, supplied with a blast to urge the flame direct on to the rock, at the Challenges mine in France. Burning small coals, this apparatus in 55 hours drove an end four feet wide and six feet high a distance of five feet; whilst two men with the usual explosives would only drive the same end from five to six and one-half feet in a month. If this were done at a reasonable cost, it would be a very fine result, but as to relative economy Serlo gives no particulars.

As to the possible future of the fire-setting method, it is unlikely that it will ever again come into use to any important extent; for, although it could hold its own under suitable conditions against blasting with powder, yet the modern improvement in high explosives and boring machinery, which have deprived miniog through the hardest rock of all its terrors, have done away with any necessity for the old process. Yet, in exceptional cases, where machinery and skilled labor are not available, fuel cheap, and the rock very hard and siliceous—conditions which occasionally confront the mining engineer in semi-civilized countries—it would be worth while to reconsider its many advantages.—Abstract of a paper read before the Federated Institution of Mining Engineers, by Arthur L. Collins.

Cement Lining in an Irrigation Canal.

The Gage canal, at Riverside, in southern California, is 22 miles long and is used for irrigating orange groves, vineyards, etc. This canal has been in use for 12 years. It was found several years ago that a great deal of water escaped by reason of gophers burrowlng in under the canal, thereby injuring the canal to such an extent that it was found absolutely necessary tn devise some means of preventing the enormous waste of water. It was finally decided to re-grade and cement the whole canal, and the contract for doing this work was awarded tn the Gray Bros., of San Francisco and Los Angeles, for about $120,000.

The cement was spread one and one-half inches thick on the banks and mixed one part cement to four parts fine, sharp sand. At times more than 300 men were employed on this work, as it only could be done during the rainy season when the water was not wanted for irrigating purposes. The first section of this work has been done nnw for about two years, and the cement holds perfectly good. Where heavy fills of earth were made, about eight inches of masonry were used. It has been found that since this work has been finished the water company has received more than twice the amount of water obtained from the uncemented canal, thus showing that friction, evaporation and loss of water by leakage were more than 50 per cent. This is supposed to be the longest irrigating canal known that is cemented throughout.—Engineering News.

Death in the Milk.

We have so often commented upon the utter uselessness and folly of dwellers in San Francisco and her suburban belongings partaking of unclean and dangerous milk, that we fear our readers will consider us afflicted with a sort of lacto-phobia. If, however, our suggestions and exhortations had been heeded, there would have arisen no occasion to repeat them, accentuated as they now are by a most grievous and fatal epidemic of typhoid fever which is now raging in the city of Oakland.

California is, perhaps, the best place in the world to produce pure milk. The climate favors health in the animals. The long dry season does all that natural agencies can possibly do to promote the health of the animals, and consequently the purity and wholesomeness of their products. In the bay region of the State, at least, there is no earthly excuse for miasmatic pools or swamps. There is no high heat and humid air which are such a tax upon animal life in the moist climates of the world. There is abundant circulation of air, moderate temperature, and where any decent care is taken there is pure water. There can be nowhere any better natural conditions for the production of pure, wholesome, nutritious milk.

And yet even in such a region and encompassed by such advantages there has cropped out an epidemic, which has already reached several hundred cases, of which the exciting cause seems to be infected milk attended possibly by defective sewerage of the region encompassed. There is some doubt as to the relative influence of bad milk and bad sewage, but it is claimed that the doctors' carriages in visiting patients, follow the routes of the milk-wagons from the infested dairy, and that other parts of the city as badly sewered, but not having the same milk-supply, are not included in the outbreak.

Nor does the source of infection in the dairy remain in doubt. It is stated that for some time there has been a case of typhoid at the milk ranch, and other cases have appeared later in the same immediate region. Chemical examination of the drinking water of the cows showed filth and organic matter in large excess, and besides this, there is a shallow well, from which water was taken for can-washing and for domestic use, the well being contaminated with sewage, although the chemical examination did not find the same objection to the water that pertains to the tank-water used by the cows. It seems likely, however, that this well water, by bacteriological examination which will probably be made, will disclose the deadly germs which have brought death and disease to so many people.

Such is the record of the evil work which has been wrought upon an unsuspecting community by carelessness and lack of proper precautions which present knowledge prescribes and the neglect of which is little less than criminal. In this case, however, the criminal charge lies against the community rather than against any individual. The dairyman who will supply cows water which he does not know to be pure and wholesome is not to be freed from an atom of the blame which should pertain to such criminal neglect or ignorance. Well-informed and progressive dairymen know that impure water in dairy practice is deadly and they exercise the utmost precaution in their practice. There are, however, especially in the neighborhood of cities, milkmen who are ignorant, careless and filthy in their life and work, and upon them the progress of dairy art and science can exert no influence. They keep filthy cows upon filthy food and drink in a filthy place, and filthy milkers put the filthy product into filthy cans from which is drawn the food supply of the babe and the invalid, as well as the strong man—all drinking disease instead of the health and strength which pure, wholesome milk would freely bestow. Is the public to endure it?

This is the phase of the question which touches most closely upon our field as publishers of a producer's journal. We hold that it is the consumers duty to himself and to the lives entrusted to his care, to know that the source from which his milk is drawn and the surroundings are such as wholesomeness requires. In the case of large towns and cities, it is, of course, impossible that each consumer should personally know these things. For this reason municipalities should give the consumer the assurance which he cannot personally secure. There should be careful and unimpeachable inspection. The parade of the ward-striker whom political interests may sometimes make custodian of the peoples' food and drink, does not answer the need. There should be expert, honest, disinterested inspection. The result would be that the abominable city milk ranches would be made unprofitable, and the crowding together of animals, and its unavoidable dangers would be done away. The city should have pure country milk from cows which have suitable range and the purest air, food and drink.—*Pacific Rural Press.*

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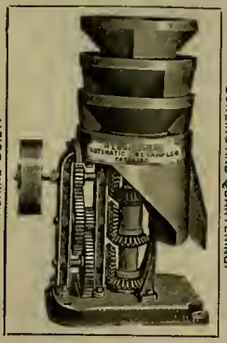

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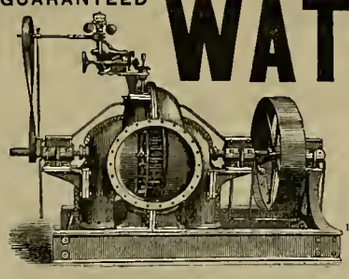

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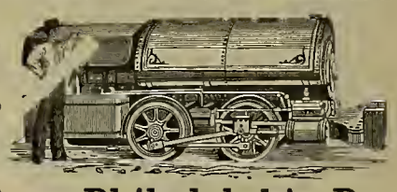

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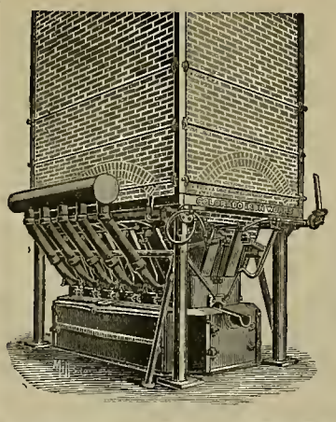

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Mechanical Progress.

Firebox Steel.

One entire session of the Master Mechanics' Convention last week was devoted to a discussion of the question: How can firebox steel he tested? Some of the facts which developed in it are worth extended notice. It is safe to say that at the present time the firebox causes more tribulation and expense than any other part of the locomotive. Boiler repairs now form a good share of the total cost of keeping locomotives in running order, and boiler repairs are chiefly repairs on the firebox. There is a very general belief, and it is prohahly a correct one, that the life of fireboxes is much shorter now than it was 20 years ago. There is also a very general belief that the cause of the shorter life nowadays is that the steel is not as good as the favorite brands of steel or iron which were in use a score of years ago. It is doubtful whether there is any foundation for this idea. The steelmakers do not take pains to contradict it, for it affords them an opportunity to preach against the practice of buying material on specifications in the open market. When the master mechanic says that steel is not as good as it used to be the steelmaker replies: "How can it be when prices are so much lower? If you will put your trust in me, and pay my price for good steel, I I will make it for you." It is the old story of manufacturer's reputation vs. engineer's specifications in the purchase of material. It was most refreshing to have the fact plainly brought out in the master mechanics' discussion that railways which were relying on the reputation of old favorite brands were being badly disappointed, while railways which were buying material on modern specifications were having comparatively little trouble with their fireboxes.

Really, when we consider the acknowledged great advance made in structural steel manufacture and the fact that the entire art of making soft steel has developed in little more than a quarter of a century, we see the absurdity of the idea that firebox steel manufacture is a lost art.

But, if firebox steel is as good or better than it used to be, why do fireboxes fail in so much shorter time? The reasons as given in the discussion were, first, the fact that a locomotive makes twice or three times the monthly mileage that was made a score of years ago; it runs faster, works harder, burns coal more rapidly, heats its plates hotter, and last, but not least, uses a great deal poorer water than the locomotive of a score of years ago. Ooe speaker in the discussion said that since the forests had been cut off the rivers were muddy in rainy weather and in dry weather were kept up mainly hy springs which carry usually more or less scale-forming matter. It is to be also remembered that in the early days of railroading, to which many of those who are now having trouble with firehoxes look back, the railways of the country were mainly in the East, where pure water ahounds. Trouble with staybolts, firebox sheets, etc., appears to be little heard of now among the railways of New England. It is those in the limestone regions of the West and South that complain.

Of course all these modern conditions of locomotive operation must be met, hut such portion of the trouble as is due to hard water can be avoided by purifying the water for locomotive use. The argument against doing this has always been that the saving was not enough to warrant the expense. But if we are to judge by the experience of the man who said in the discussion that his passenger locomotives required three new fireboxes in five years' service, or the one who said that for even a small increase in the durability of steel plates the railways could afford to pay double the present price per pound—if these things are true, then the gain by pure water would certainly warrant a large expenditure to secure it.—Engineering News.

A New Welding Process.

Before the Society for the Advancement of Industry, at a recent meeting in Berlin, Dr. A. Slahy, of the Charlottenburg Technical High School, gave a demonstration of a new electric process for welding iron, devised by M. Julien, of Brussels. The lecturer took an iron bar which formed one pole of a source of electricity, and plunged it into water containing the other pole. As soon as the bar entered the water, that portion of it immersed at once assumed a white heat; and Dr. Wedding made it into a rivet. This method is based upon the fact that if one pole of a source of electricity is plunged into acidulated water, or water having in it a salt solution, and a sufficiently strong electric current is passed through, oxygen is given off at the (lead) anode, and hydrogen at the (iron) cathode. By increasing the current, the evolution of gas can he augmented to such a degree that the iron har, surrounded by hydrogen, is no longer in contact with the solution. As, however, the hydrogen "envelope" offers great resistance to the passage of the current, considerable heating takes place, whereby the "envelope" and the iron bar are hrought to a white heat or glowing condition. In this way temperatures up to 4000° F. can, it is said, be attained. Dr. Salby states that no difficultles are experienced in regulating the temperature between 800° and 1200° necessary for the forging or welding of the iron, since the degree of heating depends upon the proportionate size of the anode to that of the cathode, as well as upon the available electric pressure. It is claimed that the Julien method is more advantageous than either the Benardos or Thomson electric welding processes, and that by its use iron bars of from two to three centimeters in diameter can be welded with current at a pressure of from 100 to 200 volts. A large lead plate suggested to be adopted as the anode, the cathode being practically formed by the appliance in which the iron bar is fixed for the time being.

Fatigue of Iron.

A highly practical and successful superintendent of motive power, who prides himself on freedom from theoretical nonsense, has taken us to task about our theories on metals being susceptihle to "fatigue." We do not know that the word properly describes the condition metal gets into preliminary to breaking, but highly practical grounds exist for the belief that metals become weakened by use even when no incipient fractures exist. There is a bending or a lengthening and shortening action going on even when the change is too minute for measurement except with exceedingly exact instruments. This movement of the metal causes molecular changes which reduce the adhesion of the particles and thereby make the metal weaker. Nearly every observing mechanic has noticed breakages where it appeared that steel or iron originally good had become so brittle and roughly crystalline that it was unfit to sustain an ordinary load.

A case occurred some years ago on the Central Railroad of New Jersey which appears to be a good practical illustration of the correctness of our theories concerning the fatigue of metals. The company named got six new switching engines that were put into the same hard service in a yard where there was a great deal of running over switches and frogs that subjected the running gear to severe shocks. The engines were all of the same pattern, strongly built, with unusually heavy axles, Col. Ricker, the designer, believing in a good margin of strength. After these engines had been in service for several years, one of them broke an axle. An inspection of the fracture showed that what was originally a fine, fibrous iron had become coarsely crystalline, the molecular change no doubt having been induced by the constant jars. Within six months all the six engines failed with broken axles, and the fracture in each instance showed the same condition of the iron.

Mr. William Woodcock, who was superintendent of the motive power of the Central when these hreakages happened, believed that reworking restored the strength to iron that had become weakened through use. He determined to put the theory to a practical test, so he worked up the broken axles into piston rods, crank pins, rod straps and other parts of locomotives that are subject to severe and complex strains. The metal gave excellent service.—Locomotive Engineering.

COAL DUST EXPLOSIONS AS A MOTIVE POWER.—Accounts come from Germany that Krupp, the famous gun-maker, is now building a number of experimental engines to test a novel idea. A German inventor has taken patents on the utilization of the general principle that finely divided carbonaceous matter floating in the air rapidly explodes. He proposes to grind coal to an impalpable powder, and after introducing the dust floating in the air into the cylinder of an engine, explode it, the idea being to follow very much the same lines which are being so thoroughly developed in the use of gas in engine practice. Naturally, the first question which has risen has been how to get rid of the ash. Krupp is reported to have stated that his experience in gun manufacture convinces him that this is not a serious obstacle. The advantages which would grow out of a direct utilization of mineral fuel as mined are very obvious. While modern practice converts only 10 to 15 per cent of the heat energy stored in coal into power at the crank shaft of a steam engine, it is believed that no less than 75 to 80 per cent could he made available by the direct combustion of fuel through explosion of coal dust.—Coal Trade Journal.

Scientific Progress.

A New Hygrometer.

Owing to the urgent need of a good percentage hygrometer suitable for general use in dwellings, Mr. O. Krell has occupied himself with the subject for some time past, and the results of his investigations are published in a recent number of *Gesundheits-Ingenieur*. The commonly employed hygroscopes are very liable to derangement, and they fail as a rule to indicate the degree of moisture as a percentage ratio, since they record the same upon some arbitrary scale. The instrument of August, which is based solely upon thermometric readings, is not liable to damage. In its general form it consists of two juxtaposed thermometers, one of which indicates the air temperature, while the bulb of the other is surrounded with muslin, kept moist by being dipped into a small vessel suspended below it, filled with water, the water from which rises by capillary action into the twisted muslin. The greater the difference between the temperature readings of the two thermometers with the wet and dry bulbs, at any uniform air temperature, the smaller is the amount of moisture in the air, and the same holds good conversely. Mr. Krell substitutes for the suspended vessel of water a glass tube open at the top, but capable of being securely closed by means of an India-rubber stopper. The lower end of this tube is drawn out to a small diameter, and is curved into a semi-circular form so as to point upward. This tube is placed on a hoard between the two thermometers, which are graduated to read from 8° to 20° Reaumur, hetween which limits the maximum range of temperature in dwelling rooms may he assumed to fall. The bulb of one of the thermometers is inclosed in muslin, attached to the upward-curving end of the water tube, and ahove the apparatus is a board, with a table giving horizontally the readings for each degree from 8° to 20°, with the temperatures indicating each 10 per cent of moisture in the air in a series of vertical columns beneath. By simple reference to this table, on reading the temperatures from the two thermometers, the approximate amount of moisture in the air can be determined at a glance, or, if greater accuracy is needed, intercalation can readily be made.

The Condensation of Ammonia.

M. Frere, In a paper read before the French Association of Gas Managers, remarked that in spite of the lowering of prices, the condensation of ammonia remains a matter of importance to gas works. Sawdust is troublesome, and expensive to work. M. Melon has shown that there are two conditions that must be fulfilled; that the gas should he kept as cool as possihle and that it should be brought into contact with a surface as large as possible, and kept constantly moist. It is not necessary, however, to lower the temperature beyond 50° or 54°, or even 59° F., if the scrubber have sufficient capacity. This is shown by experiments made in practical working, of which M. Frere gave details. The apparatus employed was very simple, being only a Chevalet washer and a water-trickle pebble-column, supplied with from 53 to 88 pints of water per ton of coal distilled. When the temperature of the gas, on its admission to the Chevalet washer, rose from 57.7° to 58.2°, the ammonia remaining in the gas rose from 0.0284 to 0.070 grains per cubic foot. On putting up another pebble tower, in addition to the previously existing one, it was found, on working the water so that the temperature of the gas was never allowed to go heyond 57.2° F., that, even when the external air was at a temperature of 86° to 88° F. in the shade, there was never more ammonia in the gas than 0.0437 to 0.048 grain per cubic foot. In winter less water was used, but the gas contained only from 0.0262 to 0.0306 grain of ammonia per cubic foot.

Ammonia can thus be almost completely extracted by very simple means; and the only thing which needs to he looked after is the water supply to the pebble tower, which must be adjusted each day to suit the external temperature and the quantity of coal which is being distilled. The pebble columns only need to be cleaned about once a year. The tubular refrigerators must be cleared of naphthaline about once a fortnight by means of a steam jet. The moderate temperature employed prevents the deposition of tar in the washer or pebble-column.

Sodium Silicate.

Sodium silicate is a substance not widely known outside of manufacturing circles, and yet it finds so many important uses that a word regarding it may not be out of place. The *Oil, Paint and Drug Reporter* (New York) gives a few words on its industrial uses, and from the note there given we make this extract. The principal use to which it is put is, of course, in the manufacture of cheap soaps, but on account of its properties it is very suitable for use either by itself or in connection with other detergent materials for cleansing articles when the action of caustic soda is too keen and the action of the carbonate not powerful enough. Several of the continental railway companies are using silicate to recover their dirty cotton waste, being ahle thereby to recover the same no less than 12 times, whereas by using caustic soda thls can be accomplished only two or three times at the most. With the silicate the strength of the vegetable fihre is apparently not injured. The silicate has also been used very successfully as a substitute for caustic soda in the manufacture of paper, especially in the bleaching of jute and hemp waste, and in the sizing and waterproofing of paper. It is an excellent fixing agent for alumina and other mordants on cotton, and is said to he unequaled as a sizing for cotton thread in preparing stock for the loom. It has been used for some 30 years for the purpose of rendering textile fabrics incombustihle. Large quantities are consumed in the manufacture of artificial stones, of eoamels and paints, the so-called silicated paints containing silicate of soda as a principal ingredient. The sllicate is also used in construction for rendering timber fire-proof and walls water-tight, or air-tight, for soaking bricks to prevent diffusion, for painting steam-pipes, and, mixed with ashestos, as a non-conducting material for jacketed pans, retorts, etc. It may be used alone or in connection with other materials as a cement for stone, glass, porcelain, marhle, etc., and for attaching labels to metal surfaces. Certain cements owe their hardening property to the silicate of soda contained.

The Welsbach Lamp.

The German *Journal of Medicine* published a circular from the Ministry of Clerical, Medical and Public Institutions in Berlin to the officials of the universities, clinics, etc., in a body. This circular states that several experiments are being made with the Auer lamp (known in this country as the Welsbach) in order to form an opinion as to whether, and to what extent, it is adaptable for use in puhlic buildings, auditoriums, laboratories, clinics, and so on. The above-designated officials point out that they can obtain five times more lighting capacity from gas hy the use of the incandescent gas lights (Welsbach mantles) than they can with the Argand burner, and with considerable economy in the use of gas they can still get three times the lighting capacity. Further, that the incandescent gas light burns evenly and steadily; that the air in the room remains pure; that health is not impaired by its use; that, owing to its white light, it is as easy as with the electric arc lamp to distinguish plainly all the other colors which are found in important operations and researches; finally, that it had proved itself adaptable for microphotography and work with the microscope. After enumerating the above and still other advantages of the mantle, the circular concludes as follows: "After all this, the incandescent gas light can be thoroughly recommended for improving the gas lighting of the universitles, institutes, clinics, etc. In many cases the incandescent gas light makes a suitable substitute for the electric light and causes the latter to be dispensed with. I would respectfully ask you hereafter to please have the incandescent gas light fitted up wherever suitable. The expense incurred can form part of the current expenses. It is fortunate that the Auer mantle, which is the invention of a Viennese gentleman, Dr. Karl Auer von Welsbach, enjoys so pronounced recognition abroad.

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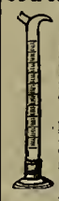
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Electricity.

Output of Dynamos.

In the early days of electric lighting a machine that would run, say 200 or 300 incandescent lamps, says Mr. Arthur F. Guy, in the London *Electrical Engineer*, was considered to be a large-sized one, but as time went on, their output became greater and greater, until now, when the electric light may be said to be solidly fixed on sound foundations, for lighting, we have machines built for running 10,000 incandescent lamps of 16 c. p.; and for traction, machines of 2000 e. h. p., or 1500 units. The Westinghouse Company has put down 12 alternators for running the lights of the Chicago Exhibition, each capable of running 15,000 lamps of 16 c. p.; the armatures of these enormous machines alone weigh 18½ tons each. These alternators are believed to be the largest yet run by belting, and it may not be long before such sizes as these, and in all probability larger than these, will be used for generating electricity in central stations. With arc lighting machines working at a constant current, there is a limiting factor, which is very difficult to get over, and that is the pressure. Every additional arc lamp in the circuit signifies another 50 volts pressure at the dynamo terminals. The largest continuous-current arc lighters run 60 lamps in series, and therefore they have a working pressure of 3000 volts. It is very difficult to insulate armatures of continuous-current machines working above this pressure, the high pressure being ruinous to the insulation. In additinn to the inability of the armature coils to withstand such pressures, the greatest care must be exercised by trimmers and circuit men in handling the lamps, wires, etc. Since a full arc lamp takes about 10 amperes, and absorbs a pressure of 50 volts or so, therefore 60 lamps in series will require 3000 volts pressure to maintain a current of 10 amperes through the lot, so that a 60 arc lighter has an output of 30 kilowatts, or units, each lamp taking half a unit.

The output of the electric machines is reckoned in kilowatts, often called for shortness, units, because the kilowatt is the unit of electric power. This expresses the power of the machine or *rate of work* done, and the word unit applied as above must not be confounded with a Board of Trade Supply unit, which is often called a unit for shortness—this latter signifies a kilowatt of electric power working for the space of one hour, and producing a kilowatt-hour of electric energy, or *quantity of work* done.

There are many commercial data concerning dynamos that are very interesting and, what is more, extremely instructive. Among such are: weight, floor space, speed, output, etc., of machines compared with their first cost; and the different pattern machines can be compared, when figures can be worked out, given such data as number of watts a certain dynamo can develop per pound dead weight, the machine compared being of the same, or almost the same, output, speed, type, and such matters; then machines of greater sizes can be similarly compared. Another interesting matter to know is the number of watts per square foot of floor space machines can give for various sizes and speeds. A third matter is the cost per unit for various sizes and speeds. For all the above, curves can be plotted, and it is surprising what a quantity of suggestive information can be gathered from them.

Electric Cooking at Boston.

The people of Boston have been treated recently to several exhibitions of electric cooking apparatus. One of the latest public tests is thus described in the *Boston Traveller* of June 21st:

The American Electric Heating Corporation, 274 Purchase street, was turned into a cooking school at noon yesterday. In response to invitations a number of newspaper and well-known business men were present to witness the operation of some of the company's cooking and heating devices. The most practical illustration was the cooking of a most appetizing dinner on the apparatus devised by the company for this purpose. Of course the enjoyment of the dinner followed, and the cooking was pronounced excellent by all. The ladies, if they could see this apparatus, would go simply wild over it, for though the day was a scorcher, the heat from the oven was scarcely perceptible, and the room was, if anything, slightly cooler than the outside air. In fact, everything connected with this culinary work was so cleanly and so neatly placed and operated that it could be seen that a system of this kind might practically dispense altogether with the ordinary kitchen, and all food preparation be effected upon a side table in the dining room. The process of roasting, boiling, broiling, frying, stewing and making tea and coffee were illustrated, and all in a most satisfactory way. It was explained and readily seen that by this system the heat was concentrated just in the place where it was needed in the various operations, and this accounted for the small amount of radiation of heat from the various cooking utensils. Numerous heating devices were also shown, among them radiators of various kinds for houses, electric cars, etc. The question naturally arises concerning the cost of operation, and this may deter many from looking into it seriously; but, as a matter of fact, the company claims that all matters pertaining to domestic operations or kitchen work requiring heat, can be accomplished as cheaply by the electric current as by the method now in use. In regard to heating by electricity the company makes no claim that it can do it as cheaply as by the use of coal fuel; but it hopes to arrive at that point in the near future. The cooking and kitchen apparatus is all adapted to use any of the electric light currents, from one of 50 volts to one of 500 volts.

A New Electrical Process for Boiler Preservation.

Demonstrations of the efficiency of a new method of cleansing and preserving steam boilers against pitting and general corrosion were made on board the steamship Tenasserim, Glasgow, by the Electric Anticorrosion Company of Cardiff. The process consists of fixing electrodes in the boilers and sending periodically currents of electricity through them under definite conditions, adjusted and controlled by apparatus which is automatic in its action. When the current is passing from the anodes suspended in the boiler to the shell, hydrogen is liberated on the shell and tubes, and oxygen on the anodes; then, by means of the depolarizing apparatus, the action is changed, and most of this hydrogen and oxygen recombine, the result being that during the first period the hydrogen performs two distinct functions; first, it disintegrates mechanically by its volume the scale formed on the shell and tubes; and, secondly, some of the hydrogen combining chemically with the oxygen of the oxide of iron on the shell and tubes, reduces this oxide to metallic iron, thus doing away with the oxidation of the boiler without wearing away the metal. The secondary action, in short, is to facilitate the disintegration of the scale, hasten the mechanical action of the hydrogen in bursting it off, and prevent polarization of the shells and tubes. Oxidation, it is known, cannot take place in presence of hydrogen gas; consequently the patentees contend that it will be impossible for corrosion or pitting to take place on the interior surfaces of the boiler so long as this electrolytic action is maintained; and, further, the mechanical action of the hydrogen, which is capable of disintegrating the scale, will likewise prevent its reformation.

The practical result of the application of the process is that after the apparatus has been working in an old boiler for a few months, the scale is said to be completely removed, and the surface of the iron is brought into sound and healthy condition by a deposit of metallic iron being formed on the shell and tubes. Where no lighting installation exists, the patentees fix a suitable dynamo, which may be driven from the screw shaft, and be of sufficient capacity not only to supply the boilers, but also to light up the engine room. It would seem to us, says the *Engineer*, that the dynamo had better be employed all the time in lighting, and the boilers would be best preserved by feeding them with pure water.

Invention of the Incandescent Lamp.

The history of the invention of the modern incandescent electric lamp is a curious one, says the *Engineering Magazine*. In 1878 the announcement, telegraphed all over the world, that Edison had invented an electric lamp which was to supersede gas as a domestic illuminant caused a wild panic among the holders of gas shares, who hastened to sacrifice their long-treasured securities at almost any price. As it turned out, he had at that time done nothing of the kind, but early in 1880 he actually did produce the long-promised lamp. Patents were obtained, companies organized, and a great business rapidly built up. For six years no serious efforts were made to enforce the patents, and meantime competing companies sprung up and flourished on all sides. Then came the beginning of a long, tedious and enormously expensive litigation, which at the end of another six years ended in the complete triumph of the Edison patent, which was upheld in the court of last appeal. By due process of law the competing manufacturers were one after another enjoined, their factories closed up, and their employes turned adrift. Suddenly one of the concerns thus attacked turned upon its pursuer and aimed a deadly blow at the vitals of the Edison-lamp patent, alleging that the invention had not only been made, but had been publicly exhibited and operated in the streets of New York by an obscure German watchmaker more than 30 years ago. The judge who first heard the new defense deemed the defendant's evidence insufficient, and declined to withhold his injunction, but on a second and subsequent hearing before another judge in another district an injunction was refused, thus rendering it necessary to have the whole case retried on its merits, in view of the new evidence. That the electric lamp alleged to have been made and used by the watchmaker is identical in all essential respects with the modern commercial incandescent lamp is admitted by all the experts, and hence the case is now narrowed down to the sole issue of priority of invention and public use on the part of Henry Goebel as against Thomas A. Edison. It goes without saying that the further proceedings in this most unusual case will command world-wide attention.

AN ELECTRICAL PROBLEM.—One of the most important and difficult problems now confronting electrical engineers is that presented by the condition of affairs in cities where electric railways are operated on the single trolley system. The use of the earth return for the completion of the circuit has brought about a serious accusation against the system—no less than that the escaping current in the earth has been found to seriously deteriorate lead water pipes and lead-covered cables for electric wires by electrolytic action. Complaints on this score have been made in Boston, Cleveland and Minneapolis, and now City Electrician Barrett, of Chicago, has prepared a report on the subject for the information of the Mayor. This paper seems to show beyond question that escaping current from this source does accomplish the injury attributed to it. The situation is clearly one of considerable gravity and must be fairly met. Various remedies have been proposed, but so far none has been devised that has proved entirely successful. Of course the substitution of the double trolley system would remove the cause of complaint, but electric railway companies will exhaust every other means before going to the great expense and introducing the complications which this remedy would involve. Electric railway engineers are devoting themselves assiduously to the problem, however, and we hope that their inventive ability will be equal to the task of hitting upon a successful palliative adapted for commercial use.

THE DEVELOPMENT OF DRY PLATES BY ELECTRICITY.—Dr. Liesegang, of Dusseldorf, has combined two experiments made by Schutzenberger in 1869 and Eider in 1886. He passes a dry current from six Gassmer dry cells through a concentrated solution of sodium sulphate; the zinc pole of the battery is coupled to a large platinum electrode in the outer vessel, and the positive pole is placed in a porous cell filled with the same solution. If a silver bromite plate which has had considerable exposure in the camera be placed in the vessel, a brownish-red negative image is developed in a few minutes, the solution remaining quite clear. The inability of the combination has no effect in this electrolytic method, as it is constantly being produced afresh. The picture is weak and becomes even thinner in the fixing bath.

NEGROES AS IRON-WORKERS.—The experiment of importing negroes from the South, and training them to do the rougher kinds of labor in its rolling-mills, which was recently tried by the Cambria Iron Company of Johnstown, Pa., has been abandoned as unsatisfactory. The blacks, unable to endure the severity of the labor and rigid discipline, left one by one, until they had nearly all returned home. A similar experiment with a similar result was not long ago tried by the Carnegie Company. It seems as if it ought to be pretty well settled by this time that negroes are not adapted to this kind of work.

As an instance of dwindling profits in the British shipbuilding industry, a Glasgow correspondent of *Industries* reports that ordinary cargo steamers, replete with modern appliances, are now contracted for at prices ranging from $26.40 to $28.80 per ton, or just one-half of the cost some four years ago. The dearth of orders is beginning to be seriously felt in the shipyards on the Clyde

Useful Information.

Compressed Fuel Manufacture.

For the last 30 or 40 years, according to the coal waste commission's recently issued report, a large amount of the culm of the semi-bituminous and anthracite coals has been utilized in Europe in the form of what is known as compressed fuel. The slack, after being mixed with some binding material, such as lime, clay, cement, tar, pitch, bitumen, starch, or other glutinous substance, is compressed into rectangular or spherical forms and then burned as large coal of the same size would be. Large quantities of this material have been made with profit in Europe, and many attempts have been made to utilize culm in this way in the United States. About the year 1876 the manufacture of compressed fuel was begun by the Delaware and Hudson Canal Company, Rondout, N. Y., from 92 per cent of culm and 8 per cent of pitch. The plant was sold to the Anthracite Fuel Company in 1876, and the making of bricks discontinued in 1880. Culm and gas-coal pitch were mixed in a pug mill with super-heated steam. The bricks were made of a size much like that of ordinary building bricks, under a pressure of 250 pounds per square inch. These bricks would not disintegrate in the fire, and could be repeatedly heated red-hot and then plunged into cold water without crumbling. But the cheapening of coal and additional cost of pitch drove the bricks out of the market. Of plants making compressed fuel for domestic uses, in the form of eggettes, the constituents being anthracite screenings or bituminous slack with three to six per cent of imported bitumen, there are enumerated as in present operation the plant at Gayton, Va., using semi-bituminous, the capacity of which has recently been doubled; that at Milwaukee, which utilizes anthracite screenings made in the shipments of anthracite coal from lake to lake ports, and that at Huntingdon, Ark., which utilizes bituminous slack. In addition to these, a new plant has been ordered to be constructed in Chicago, with a capacity of eight tons per hour, hard and soft coal; and another new company has been recently organized to erect one at Denver. The commission's inquiry has led it to believe that "this method of utilization seems to be most successful in cities where the coal can be sold well and where there is no freight to pay."—American Manufacturer.

Manufacture of Alum in India.

There are some alum works at Kalabagh, on the Indus, at the western end of the salt range in the Punjab. They are owned and superintended by a native khan, who is said to be worth some two lakbs of rupees. The raw material or black alum shales, composed of silicate of alumina and iron pyrites, are brought by coolies from a spot about two miles away to the river bank at Kalabagh, and broken up into lumps about five inches across. A layer of brushwood and small branches is spread on the ground, and above this are placed alternate layers of about a foot thick of broken-up shales and brushwood. The heap is made about fifteen feet high and is then ignited from below. The burnt clay is then thrown into square earthen vats about ten feet long and two feet deep, and thoroughly mixed with water. The water containing the soluble part of the burnt shale is after a time drawn off into a similar vat, and the red suspended matter allowed to settle. It is again drawn off into a shallow circular vat about ten feet in diameter, and made of plates of sheet iron riveted together. A furnace is built under this. The solution is then boiled with an impure sodium and potassium salt called "jamsan," obtained from "reh," the sodium sulphate and carbonate efflorescence, found so commonly in the Punjab. The liquid, after boiling some twenty-four hours, is drawn off, and allowed to crystalize in vats of sun-dried clay. The crystals are about half inch in thickness, and of a light grayish-green color. These are stacked and allowed to drain for ten days. After this they are put into earthen pots, holding about 1½ maund, with a little water, and are heated in a kiln or oven. The earthen pots are broken open when cool, and large crystals of alum some six inches long are found inside.—Artisan.

USE OF MONKEY WRENCHES.—Don't use a monkey wrench backward, *i. e.*, do not put the strain on the wrench so as to spread the jaws. This can easily be remembered by always thinking to pull the way the jaws point. The spreading of the jaws, which we so often see, is caused by the back or main bar of the wrench bending under the strain. So, if we pull backward, there is nothing to keep the bar from bend-

ing hack; hut if we pull as we should, the hack cannot bend unless the nut or bolt-head crush or the jaws give way to a slight extent or the bar actually stretches. As neither of these are likely to occur in ordinary use, it can he said to he almost impossible to hend a wrench until the jaws open like an alligator's, if we take the precaution to always pull the way the jaws point, which can easily be done.—Artisan.

The Ocean Racers' Coal Bills.

Referring to a paragraph going the rounds to the effect that an "ocean racer" hurns about $13,000 worth of coal every trip, the *Marine Journal* says:

"Very little calculation will show how extravagant this statement is. The American liner New York consumes about 328 tons per day, the White Star liner Teutonic about 316 tons and the Cunarder Etrurla 330 tons per day at full speed. It has heen stated that the Etruria, at a speed of 18 knots, hurns only 275 tons per day. This consumption would send the greyhounds across with a total use of about 2000 tons in round figures. The price of coal in New York is considerably less than $4 per ton, and in Liverpool it is cheaper than here, hut even at outside figures the cost of fuel per trip, it will be seen, does not exceed $8000, and we would not he surprised to find the actual average price paid to he less than $6000.

"The fuel hills of such ships are of course far in excess of those of the average ocean steamer. The triple-expansion engines and improved machinery of the present day have made it possihle to so economize coal that the indicated horse power per hour has heen reduced in ratio to much less than two pounds, as against nine pounds in 1836 and five and one-half pounds in 1840. The Teutonic's average is quoted at 1.6 pounds per hour. The majority of ocean steamers of ordinary size, traveling at an easy gait, think a ton of coal per hour is quite extravagant enough for their propulsion. Our hig new warship Iowa will have a hunker capacity of only 2000 tons of coal to speed her at 16 knots, the Indiana's hunker capacity will be 1800 tons, the 3000-ton cruiser Cincinnati's bunker capacity will be only 556 tons, and the crack Japanese ship Yoshino, with a speed of 23 knots, has hunkers to hold only 1000 tons. It is douhtful if the hunkers of any steamer afloat would hold $13,000 worth of coal if bought in New York."

Stone Lithography Discovered.

One of the greatest discoveries ever made was the result of the purest accident, says *Stone*. It was the year 1796. The citizens of Munich had just witnessed the first triumphant performance of Mozart's opera, "Don Juan," and the theater was deserted hy all save one man, Alois Sennefelder, who, after making a round of inspectlon in the huilding to see that no sparks had ignited anything comhustihle, retired to his room to stamp the tickets of admission for the day following. When he entered his apartments he had three things in his hand—a polished whetstone which he had purchased for sharpening razors, a ticket stamp still moistened with printing ink, and a check on the treasurer of the theater for his weekly salary. As he placed the latter upon the table a gust of wind swept it high up in his room for a moment and then deposited it in a basin filled with water. Sennefelder dried the wet paper as well as he could and then weighed it down with the whetstone, upon which he had before carelessly placed the printing stamp. When he returned to his room the following morning he was astonished at seeing the letters of the stamp printed with remarkahle accuracy upon the dampened paper. A thought came to him. He wondered whether hy some such means he could not simplify his work of continually copying the songs of the chorus. He went out and purchased a large stone, commenced making experiments, and, as we all know, finally discovered the art of printing from stone—lithography.

SPIDER'S WEB FOR TELESCOPES.—The exceeding fineness ot the spider's web long ago suggested its use as a textile material in place of silk, and very delicate fabrics have been thus produced. But it was evident that no results of practical value could be attained in this line, unless spiders could be reared in large numbers and the thread wound from their cocoons. Individually the spider lends himself to this purpose in a very satisfactory manner; hut the thing which interfered with the prosecution of the industry, and finally frustrated it altogether, was the inconvenient habit which the large spiders have of eating the smaller ones, this practice continuing in a colony until in a very short time only the higgest spider remained, rendered still higger hy having assimllated its companions.

One important use remains, however, to which the spider's weh is admirably adapted—that of making the vertical and horizontal lines which are stretched across the field of vision of a telescope. Nothing hetter than the spider's web can he desired for this purpose, it heing very strong as well as fine, and proof agalnst expansion or contraction hy heat, cold or moisture. It was at one time supposed that the hest threads might he ohtained from the large spiders of China, hut experience has shown that the American "turtle-hack" spider has no superior in this respect. It ahounds in the neighhorhood of Washington, where its weh is gathered to he used in the telescopes of the United States Naval Observatory.—The Paper Mill.

A NEW SAFETY LAMP FOR MINERS.—St. Louis *Globe Democrat:* "An ingenious form of electric saiety lamp is now made for use in dangerous mines, powder magazines and all places where an accidental breakage of the glass hulh might lead to an explosion. In order to entirely eliminate the chance of any such danger the inventor has enclosed the lamp proper in an ahsolutely air-proof lantern, the peculiarity of his device heing the means of switching the light on and off. The wires are attached to the internals on the hase of the lantern, and underneath the lamp socket there is a small pair of hellows which make the necessary contact on heing inflated. On the cap of the lantern is an air valve to which a ruhher pear-shaped syringe can he attached. On compressing this the hellows become distended and switch the light on. Should the lamp fall and he hroken the escape of the compressed air releases the switch and instantly cuts off the current. Moreover, should the interior lamp happen to be broken the superfluous air fills up the vacuum and the same effect takes place."

FIRING AN ENGINE.—Did you ever notice a fireman feeding an engine? There is a science about it that is not understood hy one not in the husiness. There is a way to throw in the coal, and to empty the shovel and close the furnace door at the same time that requires nice calculation. The same science will tell how many scoop-loads are needed to send the hands on the gauge to the proper figure. Deft handling to keep the deck of the cahin clean and a hundred other lIttle things that go to make a skillful fireman—one that saves money hy hushanding the coal. The fireman in the old days on the wood hurner had a hard time of it and certainly earned the small money he received for his services, hut he had a sinecure compared with the man who stokes up one of the huge "moguls" of the present day. These engines haul freight and eat up coal as if it were greased paper. The fireman is at work continuously.

IN the year 1892 the Almaden mines, Spain, produced 20 473 tons of quicksilver ore, of which 13,488 tons were treated. The output of quicksilver was 44,804 flasks of 34.5 kilos. "El Porvenir," a new mine in the Asturias, working a sandstone carrying sulphuret of mercury, produced in 1892 from 5350 tons of ore 2087 flasks of quicksilver.

In the matter of inventions, it is a curious fact, says the New York *World*, that Prof. Bell's latest devlce of importance, the "waterphone," for locating leaks in water pipes, was suggested to him hy observing a plumher's apprentice endeavoring to find a leak by means of a small rod which he held in his mouth and touched against the pipe.

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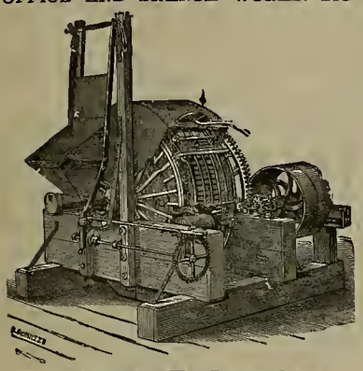

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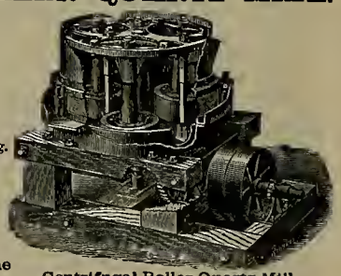

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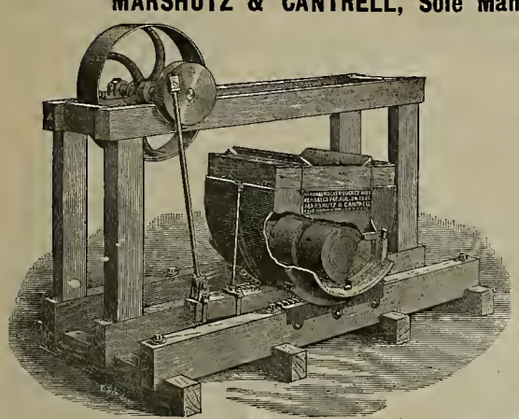

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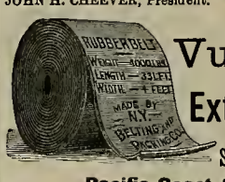

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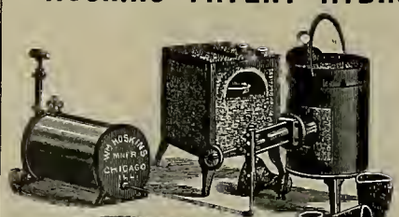

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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned

CALIFORNIA.

Calaveras.

STARTED UP AGAIN.—*Mt. Echo*, July 8: Operations were resumed in the Calaveras Consolidated mine at Robinson's Ferry last Monday. Quite a large number of men were put at work in and about the mine, and things are now running as of yore. This property has lain idle for a year or more, and it gives us pleasure to announce the fact of the resumption of work.

THE LITTLE GIANT recently placed in position at the Stickle mine, as a protection against fire, has been tested and gives the best of satisfaction. It throws a large stream of water a distance of nearly 300 feet, and the pipe can be handled almost as easily as a garden hose.

THE BOLITHO quartz mine, situated near Angels, owned by Hardy and Osborn, ranks among the best mines in this part of the country. To be sure it is not thoroughly developed as yet, but sufficiently so as to demonstrate the fact that it is a valuable mining property.

Humboldt.

HYDRAULIC MINERS HAVE WATER TO SPARE.—Blue Lake *Advocate*, July 8: The *Advocate* has already contained an intimation that the miners along the Klameth from Weitchpec to the Siskiyou line were exchanging smiles of supreme satisfaction over the possession of a supply of water that would enable them to run much later than usual. This virtual assertion receives emphatic corroboration from Mr. William Garrett, of Orleans Bar, who last Saturday was in town. The following named hydraulic mines are now in operation: Two claims of William Lord at Weitchpec; the Allen & Lord mine at French Bar, 12 miles above; Allen & Lord's Redcap claim one mile farther up; J. A. Pearch's mine at Orleans; Alexander Markson's claim, two miles above Orleans, and the Nelson mine near the Siskiyou line. With regard to the length of time these claims will be able to run, Mr. Garrett thinks that while some may close down about August 1st, others will be in a position to continue until the middle of that month.

THE MOREE HILL MINE.—Mr. W. G. Miller is home from the Klamath. He is billed for a stay of a month at least in Blue Lake, there being a temporary lull in operations on the Morek Hill mine. Hitherto water for prosecution of operations has been derived from two sources, Cappel creek and a gulch hard by, the combined streams being sufficient for all purposes. But the flow from the gulch having given out, there ensued a deficiency which cannot be provided for until the capacity of the ditch from Cappel creek shall be increased. There is no abatement of faith in the mine there. No doubt exists in the mind of anybody acquainted with it that it is very valuable property, and work upon it is to go right on. Mr. Ralph Pentin remains here.

Mariposa.

QUARTZ MINES.—Merced *Star*, July 7: There is no part of California where the field is as good for investment in quartz mines as in Mariposa county. Of course the old Fremont Grant covers a large scope of the mining lands of the county, but there are places outside of these lines which are rich in quartz and placer gold. The country in and around Hornitos is still rich, and with a judicious outlay of capital could be made a thriving section in a very little while. There are numerous good mines there that have yielded large returns in days gone by, and with a very small outlay could be put on a bullion-producing basis. Fuel is the largest item of expense, but with the improved electric appliances this cost could be greatly reduced. Other sections, such as Sherlocks, Whitlocks, Colorado, Sweetwater, Hite's Cove and Coulterville, all abound in rich quartz mines, which, with careful management, could be made to yield handsome returns. Coulterville is showing up good mines all along the line. The Southerland, after long work of very discouraging nature, has at last proved a very rich property and the shipment of bullion is a monthly occurrence. The mines of the Cook estate are attracting a good deal of attention and will soon pass in other hands and the property put into shape for active work. These mines are very rich and the suspension of operations was caused by the death of the owner. Perhaps no mining field in the world is so undeveloped as Mariposa county. Here, within 200 miles of San Francisco, are vast areas known to be rich in mineral wealth, but almost entirely undeveloped. It is singular that most of this district, while now undoubtedly richer than the average diggings of '49, is passed by for other districts not nearly so promising and far more remote. That a day of prosperity will soon dawn for Mariposa county cannot be doubted by those who are keeping in touch with mineral development elsewhere. The enterprising and adventurous will reap the reward.

Mono.

A PROFITABLE SALE.—Bodie *Miner*, July 7: The expert who was sent from San Francisco to examine the Ward mine at Green creek, for a company of mining men, has returned to that city, taking with him a number of samples of the ore. From his examination he was much pleased with the property, and if the samples taken below yield satisfactory returns, there will no doubt be a sale.

ABOUT BENTON.—Hawthorne *Bulletin*, July 7: A correspondent at Benton writes as follows: A reported rich gold find in Clover mining district, some two miles from the Wild Rose mine, comes to hand. Ore assaying way up in the thousands has been brought in. This is supposed to be the finding of a long-lost mine, originally discovered by an Indian, and somewhat resembling in its history the famous Pegleg mine of southern California. On Blind Spring Hill the mining outlook is not of an encouraging nature, owing to the present silver depression and lack of production of high-graded ores.

Nevada.

BETTER TIMES AHEAD.—*Herald*, July 7: The Bloomfield mine, at Malakoff, which is now being worked by the elevator process, as used at the Kate Hayes mine, French Corral, is reported to be doing well. A number of men have been put on lately, and, the mine being well lighted throughout by electricity, the miners are kept working night and day. This means better times for North Bloomfield, and the rest of the county will rejoice with that town in its future prosperity.

THE PROVIDENCE QUARTZ MINE. — Nevada *Transcript*, July 8: When the Providence quartz mine was closed down a few years ago it gave Neveda City the blackest eye in the quartz-mining line that it had ever received before. But of course the greatest blow we ever experienced was the stopping of the hydraulic mines. When the owners of the old Providence ceased working their mine even the most enthusiastic believer in the district looked somewhat crestfallen, and began to think that if the "old reliable" (by which name the mine was familiarly known) had petered, surely there was not much hope for any other mine, and it would be only a matter of a short time when the beautiful Queen City of the Sierras would be inhabited only by the wild beasts of the forest, or, in other words, it would be knocked into "smithereines" as badly as the Meadow Lake district. The suspension of work at this mine had a bad effect generally upon the whole district. Mining speculators and capitalists, when they learned that the principal mine in the district had given out before any great depth had been reached, very naturally concluded that this section was a good place to keep away from. For a long time monied men could hardly be induced to talk about our mines, and would not listen to any proposition to invest, notwithstanding the most liberal offers were made to them. Four or five San Francisco gentlemen finally came up and examined the mine, with a view to purchasing it, and they did so and placed Col. Carl Davis, one of the best quartz miners in the State, in charge. Regarding the outlook as favorable, they bought the mine and placed a large sum of money in bank for the purpose of developing the property. There was much "dead work" to do before anything else could be done. The main shaft had to be retimbered in many places and repairs were necessary here and there throughout the mine and works. At first employment was given to about a dozen men, which force was increased from time to time, and to-day the company have 81 men on the payroll. They have erected the finest chlorination works in the State, which are in full operation, working all the sulphurets that come from the mine. Thirty stamps are kept running night and day and there is ore enough in sight to keep the mill going for an indefinite period. There are two ledges in the mine, one being in slate, the other in granite, both of which are looking well. The history of the Providence mine is similar to that of other mines in this county, and shows that mines are often considered worked out, when in reality their development has only just begun. The old theory that gold quartz ledges do not extend beyond certain depths has been exploded and by the use of improved methods, economical and skillful management, many other mines that have been closed down could be reopened and successfully operated.

CENTENNIAL MINE.—Grass Valley *Telegraph*, July 10: Mr. A. W. Stoddart, superintendent of the Centennial mine, returned from Sacramento Saturday night. Immediately upon his arrival men were engaged to start to work at the mine, and operations will be vigorously prosecuted. There is a fine plant upon the mine and in a very short time the water will be pumped out and a force of miners put to work stoping out the rich quartz for which that mine is famous. The company recently formed in Sacramento to operate this property has great faith in the mine, and we are glad to see the people down in that section of the country manifest so much interest in our quartz mines. Grass Valley is to-day the best mining district in the State, and has been for the past 40 years.

AN APPRECIATION.—There was never a more surprised man than George Starr on Saturday. Mr. Starr is and has been the superintendent of the Empire mine for years and has tendered his resignation to the company, to go to South Africa. The miners of the Empire gathered together on Saturday afternoon and the stamps, cages and everything around the mine was stopped, while Mr. Starr was suddenly sent for and found an elaborate lunch spread out before him and a beautiful gold watch and chain awaiting his acceptance. The gift was presented by the employes of the mine and Mr. Richard Angove was the "talker" on the occasion, and he did his speech so well that George Starr could hardly "come back." The gift is a beautiful one and is highly prized by the gentleman who received it from such appreciative friends.

Placer.

GOOD GRAVEL.—Colfax *Sentinel*, July 7: The Morehead mine at Deadwood is yielding good paying gravel at present, and bids fair to become a good mine. Dr. J. LaBaree of Forest Hill is at present in San Francisco organizing a company to work his mine near Weske Hill. Mr. LaBaree has spent considerable money in developing his property, and has considerable faith in its ultimate paying qualities. The mine is known as the Louisiana Consolidated, and, no doubt, if Mr. LaBaree's plans as to its development succeed, it will be one of the mines of the divide. The Mayflower is running with the customary force. At present an air-shaft is being sunk by the boring machine. This machine continues to work well, and is a great saving in prospecting. The work of pumping out the water in the old Turkey Hill mine is progressing very well, and in a few weeks it is supposed that it will be emptied. This mine itself is not to be worked, but adjoining ground is to be worked through it. If this venture is a success, it will benefit Michigan Bluff a great deal. The Hidden Treasure at Sunny South continues its usual dividends. The same may be said of the Morning Star at Iowa Hill and the Pioneer mine at Damascus. There are quite a number of miners on the Forest Hill, Iowa Hill and Dutch Flat divides prospecting for gravel and quartz, and the indications are that in the next few years quite a number of new mines will be developed.

WHAT A DIFFERENCE.—What a difference six or eight millions of dollars a year from the hydraulic mines would make in these panicky times in California? Much of the distress of to-day would be relieved if the hydraulic mines were again allowed to give employment to thousands of people. The farmers themselves would reap the benefit at once in the hundreds of thousands of dollars worth of produce that the miners would buy from them.

San Bernardino.

VANDERBILT DISTRICT.—Los Angeles *Herald*, July 8: For the past six or eight months the attention of prospectors and monied mining capitalists has been directed to Vanderbilt, the new mining district in San Bernardino county, 35 miles this side of the Needles. The camp was first brought into prominence by the news of a rich strike by Mr. Taggart and some others some time last year. It had been known to prospectors for years past as a rich country, but as prospecting was accompanied with great difficulties and hardships, it was not carefully gone over until the advent of Mr. Teggart. Since then a large number of prospectors have gone into the new district and have staked out many claims. There is one very remarkable feature of Vanderbilt, however. Thus far its growth has been healthy and it has advanced steadily. As yet the bare grub-staked prospector has not put in an appearance to any great extent, no mushroom excitement has been raised, and all is moving forward with healthy steadiness. Extensive capital has been placed in the district, and the work of developing the different claims goes along easily and surely. There is no question but that Vanderbilt has a great future before it, as the presence of the capital of men like Mackay and Flood would naturally suggest. Copper, some silver, galena and iron are also found, but the big-paying metal is gold, which is in the greatest proportion and value. Copper is also found in good quantity. The most of the ore throughout the Vanderbilt district is easy to work.

San Diego.

JULIAN NOTES. — *Sentinel*, July 7: Louis Shilling has been working a ledge of glassy-looking quartz at odd times a short distance from his home. A few days ago he struck a rich bowlder abounding in sulphurets of iron at a depth of about 15 feet, very rich in free gold. Quite a number of batches await crushing at the Ready Relief mill in Banner. A large body of very rich rock abounding in free gold is being worked in the lower level of the Ready Relief.

Siskiyou.

BLUE GRAVEL.—Yreka *Journal*, July 5: Day and night shifts are kept steadily at work on the Greenhorn blue gravel mine, with good success. Owing to the foul air, the men are now running a tunnel to the open shaft at the north end of the claim, in order to obtain a current of pure air. Before suspending work to open a passage to the north shaft, the blue gravel taken out was paying handsomely, which the men will commence taking out again by the end of this week. Twenty-three men are employed in working this mine, and the gravel bed is about 107 feet below the surface. The company expect to help out the financial market to a great extent this summer in supplying gold for circulation. The river miners at Honolulu on the Klamath river are pushing work in sinking down to pay gravel, the season being later than usual, to keep the river too high for getting the wingdams built until late. Although they may not have as long a term for operating their claims as customary, they feel confident of taking out a good average yield of gold dust. C. B. Jillson & Co., of Cottonwood, have had a fine run in their blue gravel hydraulic mine this year, and as soon as the water supply slacks up to suspend operations, will clean up, expecting to realize the largest yield of glittering dust yet procured from their claim. The winter rains come just right to keep up the water supply, and the frequent spring rains and cool weather also proved highly advantageous. It is reported that W. H. Smith, of Cottonwood, has made a deal with a mining expert for the sale of his hydraulic claims to a Minneapolis syndicate, at a good figure. The agent of the company has given the claim 30 days trial in prospecting, and was so well satisfied that a bonus has been put up to secure the transfer. There will be considerable work carried on this season in quartz mining on Hungry creek in the Siskiyou foothills, where some very rich lodes exist, that require only the investment of capital to develop them with great profit. Operations will be commenced there just as soon as the snow disappears, which will be very shortly.

Sierra.

THE JOHNSTON CONCENTRATOR.—*Mountain Messenger*, July 1: In company with Jos. Ruth, the editor visited the Gold Bluff quartz mine last Monday afternoon, for the purpose of inspecting the new Johnston concentrators, recently put up by Supt. Kraft. These machines were invented and patented by Geo. Johnston, who, by the way, was the first inventor of the revolving belt concentrator, "with raised edges and a shaking or rocking motion from side to side," which was patented July 9, 1867, by Geo. Johnston and E. G. Smith. His latest patents of Jan. 10 and 31, 1893, are the best, however, as simplicity, great durability, ease of operation and marked increase of sulphurets saved were the objects aimed at. This concentrator has the belt frame suspended from four non-parallel hangers placed in the frame, end, by regulating their angle, the oscillation necessary to keep the sides of the belt from being overloaded with sands is obtained, while the oscillation is not sufficient to overload the belt in the center, which is the case with the rocker. The belt is made of canvas, and is a big improvement on the old rubber belts. Numerous small rollers at an angle of 45° stand in a slotted base screwed to the top of the belt frame, which effectually prevents overflow by keeping up the sides of the belt, and if the belt shifts to either side it can be followed by these rollers and answers all the purposes of molded edges, which are always very expensive and short-lived. The pulp box discharges the pulp in narrow channels five or more inches apart in the direction of the belt's travel, leaving spaces on the belt where sulphurets can remain undisturbed by the fall of water and sand, and pass up to the clear water at the head of the belt, while the sand at the same time passes down unobstructed. The machine has a 2½-inch shake and 112 actions to the minute. To illustrate the amount of work one of them can do, it is only necessary to state that two of the Johnston concentrators have been taking pulp from 20 stamps, which is double the work any other machine on the market will do. In addition to this, half a ton of sand was fed into the machines one day last week, and they handled the 20 stamps and the extra sand in a most satisfactory manner, and were not overcrowded then. Taking it all together, it is the best and most satisfactory machine we have ever seen. To prove what Supt. Kraft thinks of them, we will say that as soon as he saw them work he immediately ordered two more, which arrived last Monday and were immediately set up. We have just learned that the result of the four last assays of tailings is only a trace of gold. Supt. Kraft is highly pleased. After we had inspected the lower department, we were taken in charge by Amalgamator George Black and shown through the mill. George has had many years' experience as amalgamator in many different mines throughout the county, and thoroughly understands his business. Jake Bernhardt is night amalgamator and Otto Nessler runs the rock-breekers in the daytime, and keeps enough rock crushed and in the bin to make night running useless. Supt. Kraft has displayed great caution in choosing his mill hands, and has about as able a crew as it has ever been our fortune to see. Gold Bluff is bound to prosper, and we predict a bright outlook for our other rich quartz mines in this vicinity, especially the old Good Hope, now known as the Oxford.

Tuolumne.

TUTTLETOWN NOTES.—Tuolumne *Independent*, July 8: The McAllister brothers are working the Atlas and are getting a good prospect. Pocket mining on Jackass Hill is not a very lucrative calling just at the present time, although a good many follow it. Messrs. Snow, Brownlee and Elsbree are getting a good prospect on the old Wickam and Gele claim, owned by J. N. Gillis. William Moyle and Robert Coughlin continue to take out good milling ore from their mine. They had some rock crushed at Joe Hempton's mill avereging $71 per ton. The pay chute is over 60 feet long, and they have about as good a claim as a person could wish for, and are deserving of their find. Sherman Wetmore and Mr. Penrose are also working on their mine, giving the owners a royalty and are doing well. Mr. Albert Virtong has sunk a shaft down 60 feet and has a fair chance to get a bonanza his gold magnet has located for him. J. N. Gillis is interested in the contrivance and if gold can be found by the use of it, he says he is a millionaire. One thing we know about it, Mr. Virtong has faith enough to back his claim by the use of giant powder and plenty of good muscle.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—Virginia *Chronicle*, July 8: 1500 level—A winze started at the end of the drift run east from the bottom of the winze sunk from the end of the southwest drift, 75 feet above the sill floor of this level, has been sunk during the week 5 feet in quartz and narrow streaks of ore assaying $20 per ton. Have been making repairs to the main south lateral drift on the sill floor of this level. 1600 level—Gas has been escaping from the old stopes which lie in the northern part of the California ground east of and above the sill floor of the main south drift, and is coming out into that drift. We are bulkheading and closing the openings in this ground in order to confine the gas in that end of the mine. 1650 level—Have continued making necessary repairs to the drifts on the sill floor of this level and to extract some ore in working north from the crosscut run west from the northwest drift. The upraise which was started from the drift run west from these north workings, 27 feet above the sill floor of this level, has been carried up 7 feet; total height, 83 feet, the top being in porphyry. Have continued to extract some ore of average quality in working on the north and south sides of the drift run east (at a point 20 feet down) from the winze which was sunk from the crosscut run west from the main northwest drift. Have continued to extract

some ore of very good quality in working upward from the end of the drift run south from this winze at a point 52 feet down. To some extent, there was a cessation of work in the mine on and about the Fourth of July, and three days only were devoted to the extracting of ore, in which time 191 carloads were raised to the surface (about 185 tons), the average assay value of which was $38.12 per ton. There was worked at the Morgan mill during the week 204 tons, the average assay value of which (per battery samples) was $28.15 per ton. Bullion shipped to Carson Mint, assay value, $33,319.31.

OPHIR.—1565 level—The crosscut running east from the winze station on the sill floor of this level has been extended during the week 12 feet; total length, 125 feet; continuing in a formation of porphyry carrying clay separations. Have continued the work of making the necessery repairs in the shaft, being joint work with the Mexican Company. On the 4th and 5th of July all work in the mine was suspended. Resumed work on the morning of the 6th. On the 1465 level, south from the Ophir shaft, we are closing some old openings that lead to the old stopes in the north part of the Con. Cel. & Ve. mine, in order to prevent the entrance of gas, which is generated in and now escaping from those stopes.

MEXICAN.—On the 1565 level—The east crosscut from the north drift from the crosscut run east from the bottom of the winze, has been extended 7 feet; total length, 73 feet, in a porphyry, clay and quertz formation. Have continued the work of making the necessary repairs in the sheft, being joint work with the Ophir Company. Our mein operations in the mine were euspended for two days during the week.

UTAH.—340 level—The north drift from west crosscut No. 3, at a point 100 feet in from its mouth, has been extended 12 feet; totel length, 63 feet; continuing in quartzite and porphyry formation showing some value.

SIERRA NEVADA.—The intermediate tunnel on Cedar Hill has been advanced during the week 11 feet, making the total length 447 feet; the face is in clay and soft porphyry. The joint Sierra Nevada and Union west drift, 900 level, has been advanced 17 feet, making the total distence west of the joint shaft 3323 feet; the face is in porphyry and streaks of quartz.

UNION SHAFT.—The joint Sierra Nevada and Union west drift, 900 level, has been advenced the past week 17 feet, making the total distence west of the ehaft 3323 feet; the face is in porphyry and streaks of quartz.

ANDAS.—On 420 level, south drift from east crosscut No. 1 north, has been advanced 7 feet; total length, 61 feet. Work in thie drift temporarily euspended. We are cleaning ont eaet crosscnt No. 1 south for the purpose of ehutting off the water that comes from this drift.

GOULD & CURAY.—200 level—Weet crosscut No. 5, etarted in northwest drift, 432 feet from main west drift, hes been edvanced 6 feet; face in hard porphyry; total leugtb, 536 feet. Sntro tunnel level—At a point in east crosscut, 75 feet from main uorth drift, have started a north drift and advanced eame a distence of 12 feet; face in quertz. Also did some repairing to the main north drift.

BEST & BELCHER.—200 level—In northwest drift, 265 feet from onr south boundary, we have etarted east crosscut No. 1 and advanced same 8 feet in quartz giving low assaye. 900 level—The southwest drift, started from west crosscut No. 3, 20 feet from npraise No. 1, from 1000 level, has been advanced 12 feet; total length, 190 feet; face in soft porphyry. Sntro tunnel level—At a point in east crosscut, 75 feet from main north drift, have started a north drift and advanced same a distauce of 12 feet; face in quartz. Also did some repairing to the main north drift.

HALA & NORCROSS.—On 900 level have advanced the south drift 19 feet; totel length, 68 feet; face in porphyry. 1100 level—Heve advanced the south drift 18 feet; total length, 56 feet; face in phrphyry. Main shaft—We continue retimbering above tbe 1200 level, and are repairing main incline where necessary. No work was done in the mine from the morning of July 4th until the evening of the 5th.

CHOLLAR.—Are repairing the main tunnel on 250 level. We are putting in new timbers at a point 40 feet bslow the 850 level in main shaft. The north drift from the east crosscnt near the south line, 930 level, is ont 126 feet; face is in porphyry and clay.

POTOSI.—The south drift, 35 feet west of the main shaft on the 850 level, is out 130 feet; face ie in porphyry and seams of quartz. The raise in north drift, 100 feet north of east crosscnt, 930 level, is up 108 feet on the slope; the formation is soft porphyry and bnnches of low-grade qnartz. Extracted and sent to the mill the past week 559 tone and 250 pounds of ore from the 550, 930, 1000 and 1150 levels. Milled during the week 559 tons. On hand at mill 167 tons and 750 ponnds. Average battery assays, $30.98; average car sample assays, $29.71. Shipped to the U. S. Mint, Carson, 773 ponnds crude bullion.

WAAD SHAFT.—Have been engaged all the week cutting out statiou at the 820 level.

EXCHEQUAR.—Have been engaged all the week cutting out station at the 820 level Ward shaft.

ALPHA.—Have been engaged all the week cntting out station at the 820 level Ward sbaft.

BULLION.—Have been engaged all the week cutting out station at the 820 level Ward shaft.

OCCIDENTAL.—From the stopes and upraise on 650 level, we have extracted about 45 tons of fair-grade ore and are preparing to resume the extractiou of ore from the west ledge ou the 400 level.

KENTUOK.—Dnring the week we have timbered the main south drift and run a crosscut west from said drift a distance of 10 feet in ore of milling value. Have been timbering in the npralse and putting in an ore chute. The joint east crosscut is in 111 feet; face in quartz and porphyry with bunches of good ore.

NAW YORK.—The npraise from No. 3 west crosscut, 800 level, is up a distance of 37 feet on the slope; the formation is quartz, showing spots of fair-grade ore.

Osceola District.

PAOMISING MINES.—Millard *Blade*, July 8: The El Dorado and Floride, gold properties located at Osceola, are reported looming up. The owners, Messrs. Joe Huff and Mayron Bixby, have had considerale development work done there of late, a tunnel having been run abont 350 feet to tep the main ledge in the El Dorado. This property assays $11.50 in free gold and hes a four-foot vein. Tbe Florida property is a fiue one and assays $36 to the ton in free-milling ore. A specimen from this mine was left at our office by Mr. Huff. It shows free gold to tbe naked eye. The owners are abont to sell out to a company and will no doubt receive a good price for their property.

Eureka District.

EURAKA PAOPLA DISCOURAGAN.—Eureka *Sentinel*, July 8: We have lived in thie town for 23 years and have seen great floods and fires here, but at no time dnring all those calamities have we seen the people so dispirited as at the present over the depreciation of silver.

Ruby Hill District.

BIO STAIKE.—White Pine *News*, July 7: A letter received here a few days ago states that e fabnlously rich strike wes made in the Grizzly Company's mine there. It seid they crosscnt the ledge 15 feet and exposed a body of ore that goes 10,000 ounces to the ton. Blocks of the ore, showing native and ruby silver, were on exhibition at the company's office which were wonderful to look at. The writer says the new find in Rnby Hill will rival the old Eberhardt in its palmiest days. Wbile the writer may have somewhat overdrawn the real truth in regerd to the strike, there is no doubt but a rich discovery has been made. Ruby Hill ore, when fonnd, has been always very rich. In corroboration of the fact thet an important development has been made there, we find the following in the Salt Lake *Tribune*: Isaac Jennings, president of the Grizzly Mining Company, its property being in Ruby Hill district, White Pine county, received a letter yesterday from Joseph G. Sharp, the superintendent, wherein it was stated that a vast body of phenomenally rich ore had been uncovered by means of a drift from the main sheft, and that tbe area of the vein so far as then known was 15x20 feet. A carload of the ore is to be brought in by July 1st. It will have to be henled by wagon to Oasis, 75 miles, and from there the Union Pacific will bring it to this city. The cost for handling and shipping the ore will be about $20 per ton, for milling $20 and for mining $10.

MONTANA.

AT BUTTA.—*Inter-Mountain*, July 8: The week has been a quiet one among tbe silver-prodncing mines of the district. Most of them have snspended operatione entirely, or are working a few men who are engeged in keeping things in repeir. The Alice and Moulton are keeping the mines pumped ont, and will thus be enabled to etart np agein at short notice. The copper prodncers of the district are all at work. The Anaconde, St. Lawrence, Wake Up Jim, Modoc, Monntain Con. and Green Monntain mines are in operetion with a full force of men at each property. The Never Sweat will soon be another producer for the Anaconda Co. The sbaft ie connected with the workings of the Anaconda mine, a new and commodions hoist has been erected, a large engine will ehortly be placed in position, and in a few weeks ore will be hoisted from the lower levels. A switch to the ore-house is now being conetructed. The Hnmboldt mine, near the Stella, is another of the new producers of the Anaconda Co. A new shaft-honse and macbinery have been placed on the gronnd and a force of men was put to work a couple of weeks ago. Sinking is now in progress, and a ledge of rich ore has been exposed.

THE ANACONDA.—During the week the sinking crew at the Anaconda mine has been engaged in cntting the station of the 1200-foot level. When this work is completed, croescntting eouth will be commenced and in all probability einking will be resnmed. At the St. Lawrence, miners are engaged in cntting the 1100-foot station. It is said einking will be temporarily euspended at this property. A few additional minere were put to work at the Anaconda dnring the week. The Anaconda ships about 35 cars of ore to Anaconda each day, and the other properties of the company are shipping about the same amount.

THE HEINZE PROPAATIES.—The addition to the Heinze smelter ie going up as fast as workmen can do the work, and by two weeks the two new converters will be in place. The new air compressor or blowing engine for the smelter will arrive early next week. The smelter is now treating about 120 tons of Glengarry and Rarue ore per day. At present the Rarus concentrating ore is being worked at the Butte Reduction Works. The liquidator is rnnning entirely on Glengarry ore, about 50 tons per day being shipped to the emelter. The Rarus mine is showing np better as work progresses, and the rich Glengarry is keeping up its record and is turning ont large qnatities of very rich ore.

THE LUCKY BOY.—Messrs. Leary and Weisman, who own some valuable copper claims in the vicinity of Camp creek, have made arrangements for the sinking of the shaft of the Lncky Boy in that district to the 100-foot level. This is not the claim owned by Patrick Mullin of Centerville, althongh of the same name and in the same district. Four men left Butte this morning for the pnrpose of prosecuting work on the claim, and the owners expect that at that depth tbey will etrike a pretty good ledge of copper.

THE NONE SUCH.—Messrs. McWilliams, Rnssell & Lacheppelle of this city heve made a rich strike in the None Snch mine, about two and a half miles from Homestake. The shaft on this property is an incline, and is only developed 49 feet. It bas peid expsnses from the gress roots down to that depth, and a few days ago a ledge of ore was uncovered which assayed 199 ounces in silver and $2.40 in gold to the ton. Work is being actively prosecuted at present, and a shipment of ore will be made during the coming week.

THE HOMESTAKA.—Owing to the vast amount of business which F. A. Heinze has to attend to in Butte, be recently decided to relinquish the lease and bond on the Homestake in Park canyon. Mr. Heinze did this, not because of lack of faith in the property, but from the fact that he bed two of the richest properties in Butte on his hands which would keep bis smelter running full blast. A few days ego the Shee brothers secnred e lease and bond on the Homestake, and next week will begin the work of development.

THE BARTIE.—F. H. Cooney and M. Donahue of this city have leased and bonded the Bertie mine at the heed of Horse canyon, and are now engaged in taking out ore which assays $50 per ton in gold. Machinery suitable for development work wes placed on the ground last week, and the lessees expect to make a World's Fair stake if not a fortnne. The shaft on this property is down 125 feet, and, as the ore is rich in gold, the lessees will probably develop it to at least the 200-foot level.

NOT SO BLUE AT GRANITA.—Relative to the situation at Granite, the Phillipsbnrg *Mail* says: "When it became known early last week that bar silver had takeu a tremendous drop, the news that came to close the Bi-Metallic works, Thnrsday morning, was not in the least nnexpected. The mine was eccordingly practically closed, followed by a ehut-down in the Granite on Satnrday night. With tbese mammoth properties idle—the bone and sinew of Granite's support—and conscious that other silver camps afforded no more cheerful ontlook for months to come, the miners, laborers and business men alike were heartsore. Many young men of means embarked for various perts—some to their old homes, some to agricultural and others to coal and copper fields. Every one remaining wore a gloomy face, which wae gloriously changed Monday by a telegram from St. Louis ordering Supt. Henley to start up the Grenite. Half shifts were accordingly pnt on in that mine yesterday morniug, which force will consist of all married men hitherto employed and a nnmber of eingle men—perhaps 175 all told. Ae the Bi-Metallic and Granite usually go hand in hand, it is hoped that the former mine will open shortly and give employment to over 100 men.

THE LEXINOTON.—The large Knowles pump at the 1200-foot level of the Lexington mine has been hoisted to the surface, and the pump at the 1000 will also be raised. It is the intention of the management to let the mine fill with water to the 850-foot level. Below this level there is an immense amount of drifts and crosscnts on the 1000, 1200, 1300 and 1500 foot levels, and it is estimeted that it will be at least six months before the mine fills with water to the 850 level.

UTAH.

PARK CITY.—*Record*, July 8: The Park City sampling mill wes closed down yesterday noon. The only mine banling ore is the Anchor and it is not shipping. John Frenton, foreman of the Apex mine, ceme out from Salt Lake last evening with inetructions to reduce his force to four men—just enough to keep the property in good shape. The mine-owners and operators of Park City have held one or two meetings lately, but no definite line of ection for the future has been mapped out. They are apparently waiting for results. The usual amount of prospecting is not being done this year and very few claime are being actively developed. The low price of silver bas apparently placed a damper on developments as well as on production. The Crescent is still closed down and nothing definite is known ae to its future policy. The damage to the air compressor has been repaired and that machine is now ready for active eervice whenever needed. J. M. Richardson is going steadily abead with the work of preparing his new cuncentrator for active work. General Manager Keith of the Silver King mine informed the writer this week that that property would not resume operations again until the white metal recovered and went above 80. He also said no improvements would be made at all, notwithstanding that many were needed and had been in contemplation. On the morning of the Fourth the Anchor Company placed a double force at work atoping first-class ore. The rock is being stored for the present, and just what the future action of the company will be as regards continning ore extraction and shipments hinges upon a meeting of the directors, which will be held in Park city in the near future, the gentlemen composing the board being expected to arrive dnring the forepart of next week. The concentrator has been closed down and will not again be etarted up until the silver market becomes stable at some point above 80 cents per ounce. The future policy of the Ontario Company still remains an open question, though something definite ie looked for early next week, when Mr. Chambers is expected to arrive in the camp. Several rumors are floating aronnd in reference to what the company proposes to do, bnt no credence is placed in them, for the boys expect an interview with Mr. Chambers before any line of action is settled upon. Upon the policy adopted by this company depends the future of Park City.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of snecial mention:

AETIFICIAL-STONE COMPOSITION.—Hugo Gallinowsky, S. F., assignor to the Pacific Compound Stone Co. No. 500,485. Deted Jnne 27, 1893. In the preparation of tbis compound the inventor uses natural hydromegnesite, boracic and oxalic acids, and the mother liquor of seawater, together with send or concrete, peraffine oil, tar or rubber bisulphide of cerbon end fiber.

LINE-HOLDAR AND GUIDA.—John H. Griswold, S. F. No. 500,491. Dated June 27, 1893. A familiar example of this class of devices is tbe stop-pulley of tbe cord of those curtains which are secured below, seid cord passing npward through tbe stop-pulley secured above and having its fall or extremity within reach of tbe opsrator. By pulling down upon this fall, the cord will slip through the pnlley, and will raise the curtein; and in order to hold tbe cord at any point it is deflected momenterily sideways, to bind in a suitable menner. To release it, it is bronght back to a central position and allowed to run through the pulley to lower the curtein. The object of this invention is to provide a simple and perfectly operating effective device of this class, which will allow the cord to be instantly released to move it, and perfectly held when necessary. This device can be applied not only to curtains, but for holding and gniding ropes, cables, cords and other descriptione of lines which, from the character of their employment, heve to be guided and held in desired positions.

SHOA-LACA FASTENAA.—Cornelia F. Hathaway, S. F. No. 500,497. Dated June 27, 1893. The invention relates to tbat class of shoe-festeners in which a clamp is fitted to and embreces the perts of the bow or otber slip knot, whereby the letter is prevented from loosening and nndoing. The invention consiets in a two-part or sectional frame of wire having eyes at one end whereby the parts or sectione are hinged and may be closed together or opened out from each other, and a clasp fitted to the free end of one part or section and adapted to engege and to release the free end of the other part or section. Tbe object is to provide a simple, neat and effective fastening for the slip-knots of shoe-strings.

CAN-HEADINO MAOHINE.—Milton A. Wheaton, S. F. No. 499,949. Dated June 20, 1893. The invention consists of certain improvements upon a can-heading macbine which was patented to tbe same inventor June 21, 1892, No. 477,584. Tbe new machine ae changed by the improvements differs from tbe former one by so altering the jaws and changing tbeir movements that the can bodies are first received into the open jaws, after which tbe jaws are closed before the can heads are admitted into them. After the jaws are closed, each one of tbe can heade is admitted to tbe jaws through a slot which is made through tbe jew which opens and closes. In the originel machine the can bodies and can heade were admitted to the jewe simultaneously while tbe jawe were open. In the present improvements tbe upper jewe in opening do not move toward or come in contact with each other as tbey would do if they were opened simultaneously in the origiual machine, and consequently e shorter can may be heeded in the improved machine than could be in the firet one patented.

PAUNING IMPLEMENT.—Daniel Behmer, Santa Rosa, assignor of two-thirds to Adolph Blaich, S. F. No. 500,526. Dated June 27, 1893. The object of thie invention is to provide a pruning sbears the blades of which are so connected together as to produce a drawing cnt when they are closed upon the article to be severed.

INJACTOA.—James W. Stanley, Oakland. No. 500,677. Dated July 4, 1893. The invention relates to that cless of injectors formed in graduated series, and it consists essentially in a series of removably connected nozzles with air chambers, said nozzles incressing in capacity of opening from the one which connects with the source of supply to the one which counects with the discharge. The general object of the invention is to provide an injector capable of regulation, according to the necessities of the case, and the particular object is to provide snch an injector as will regulate itself automatically in accordance with the power required.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, July 13 1893.

9:30 A. M. SESSION.

300 Alpha	5c	400 Gould & Curry	35c
200 Alta	10c	100 Hale & Norcross	15c
200 Andes	10c	600 Kentuck	5o
1100 Belcher	35c	300 Mexican	50c
150 Best & Belcher	55c	250 Overman	10c
100 Bullion	20c	400	5c
150 Chollar	25c	450 Potosi	40o
200	30c	350 Savage	15c
200 Challenge	10c	500 Sag. Belcher & Mides	5c
400 Con. Cal. & Va	1.15	300 Sierra Nevada	35c
10	1.20	800 Yellow Jacket	60c
200 Crown Point	35c	100	65c

2:30 P. M. SESSION.

200 Alta	10c	100 Gould & Curry	35c
300 Andes	15c	25	30c
400 Belcher	30c	750 H & N	15c
200	35c	500 Kentuck	5c
100 Best & Belcher	55c	200 L Wash	5c
200 Bullion	20c	300 Mexican	50c
50 Challenge	10c	50 Ophir	70c
450 Chollar	30c	350	75c
65	25c	650 Potosi	40c
50 Con. Cal. & Va	1.15	500 Savage	20c
100 Con New York	5c	600 Seg Belcher	5c
100 Crown Point	40c	100 Sierra Nevada	40c
500	35c	1000 Yellow Jacket	65o

Market Reports.

The Markets.

SAN FRANCISCO, July 13, 1893.

The face value of the coins made at the United States Mints in June and for the fiscal year will be found annexed:

	For June.	July 1 to June 30.
Double Eagles	$1,460,360	$20,444,460
Eagles	3,024,900	6,599,120
Half Eagles	85	2,987,925
Quarter Eagles	58	6,335
Standard Dollars	145	5,393,715
Half Dollars	396,573	765,578
Half (Columbian) Dols.	.....	2,501,052
Quarter Dollars	213,470	2,838,613
Quarter (Col.) Dols.	10,006	10,006
Dimes	19,014	1,101,972
Five Cents	35,012	598,785
Cents	38,202	487,317
Total	$5,197,825	$43,734,878

The amount of Standard Dollars coined last year is $3,000,000 less than for the previous year and $31,000,000 less than in 1890–91. This is due to the change in the treatment of Silver. Since July 1, 1890, the Government has stored its purchase of Silver in bars rather than coin, and thus saved the expenses of coining only such amounts as were thought to be needed.

New York Specie Movement.

The specie movement at New York from January 1st to July 1st was as follows:

	Imports.	Exports.
Gold	$6,757,770	$68,700,949
Silver	1,291,330	15,052,071
Total	$8,049,100	$83,753,020

Sub-Treasury Report.

J. P. Jackson, Assistant United States Treasurer at San Francisco, reports cash on hand June 30, 1893, as follows:

United States notes	$ 115,679 00
Treasury notes 1890	30,130 00
National Bank notes	53,395 00
Gold certificates	1,880 00
Silver certificates	259,580 00
Gold coin	21,754,783 00
Standard Silver Dollars	24,108,704 00
Subsidiary Silver coin	3,587,777 40
Minor coin	19,088 95
Total	$49,931,017 35
Standard Dollars shipped in June	$124,000 00
Fractional coin shipped	87,055 00

San Francisco Metal and Coal Market.

ANTIMONY.		STEEL.	
Per lb	— @ 14	English, lb	— @ 18
BORAX.		Canton tool	— @ 8½
Refined, in car lots	— @ 7½	Sil'k Diam'd tool	8½@ 15
Powdered, do	— @ 7½	Pick & Hammer	6½@ 10
Concentrat'd, do	— @ 6½	Machinery	4 @ 5
All grades jobbing at advance.		Toe Calk	— @ 4½
COPPER.			
Bolt	22 @ —	TINPLATE.	
Sheathing	22 @ —	B. V. steel grade	
Ingot, jobbing	— @ 14½	14x20, spot	— @ 5 87½
Do, wholesale	— @ 13½	Charcoal, 14x20	— @ 5 87½
Fire Box Sheets	22 @ 24	Do roofing, 14x20	— @ 5 87½
IRON.		Do, do, 20x28	— @11 75
Bar, base	— @ 3	PIG TIN.	
Norway, base	— @ 4½	Spot ℔ lb	— @ 24
PIG IRON.			
	Spot.	COAL.	
Eglinton ℔ ton	20 00@—	SPOT FROM YARD—PER TON.	
Glengarnock	21 00@—	Wellington	$8 00
Am. Soft, No. 1	22 00@—	Oreta	7 50
Shotts No 1	22 00@—	Nanaimo	8 50
Puget Sound	20 00@—	Gilman	6 00
Clay Lane White	21 00@—	Seattle	6 50
Langloan	22 50@—	Coos Bay	5 50
Gartsherrie	22 50@—	Cannel	8 50
Barrow	22 50@—	Egg, hard	12 00
Carnoffect	22 00@—	Wallsend	7 25
CHROME IRON ORE.		Scotch Splint	8 00
Per ton	10 00 @—	Brymbo	7 50
LEAD.		West Hartley	8 00
Pig	— @ 4½	TO LOAD—PER TON.	
Bar	— @ 5½	Australian	6 37@—
Sheet	— @ 7½	Liverpool Steam	6 50@—
Pipe	— @ 6½	Scotch Splint	00@—
SHOT.		Cardiff	5@—
Drop, sizes *smaller* than B, ℔ bag of 25 lbs	$1 80	Lehigh Lump	11 00@—
Do do, B and *larger* sizes ℔ bag of 25 lbs	2 00	Cumberland	12 00@—
Buck, Balls and Chilled do, ℔ bag of 25 lbs	2 00	Egg, hard	10 00@—
QUICKSILVER.		West Hartley	7 50@—
Home trade, pr. flask	42 50 @43 00	COKE.	
		English, to load	$9 50@10 00
		Do, spot, in bulk	—@10 00
		Do, in sacks	—@11 50
		Comberland	9 50@—

NEW YORK, July 12.—Following are the closing prices for the week:

	Silver in London.	N. Y.	Copper.	Lead.	Tin.
Thursday	73		10 45	3 75	19 25
Friday	34⅛	71	10 40	3 72½	18 65
Saturday	33	70⅝	10 40	3 72½	18 65
Monday	33	71	10 35	3 70	18 60
Tuesday	33⅛	70½	10 25	3 67½	19 20
Wednesday	33	70	10 25	3 67	19 04

Mining Share Market.

The condition of the silver market keeps the silver mining stocks down so also proportionately as the metal. There is very little doing on Pine street. No news of importance has been received from the Comstock mines. As an illustration of how absurdly low some of the Comstocks have fallen during the scare, it can be said that the shares of the Bullion mine one day last week were quoted at 15 cents, or $15,000 for the mine, when the company had $19,000 in gold coin in the treasury.

The mining and milling companies on and around the Comstock paid the following sums for labor during the month of June: Andes, $1400; Belcher, $7124.33; Best & Belcher, $2135; Consolidated California and Virginia, $12,488.50; Challar, $2904; Crown Point, $4791; Confidence, $328; Challenge, $328; Consolidated New York, $1471, Gould & Curry, $2828; Gould & Curry and Best & Belcher shaft, $120; Hale & Norcross, $4841.75; Kentuck, $2008; Mexican, $2488.50; Nevada mill, $2755; outside quartz mills (estimated), $7000; Ophir, $2770.50; Occidental, $1720; Potosi, $13,476; Savage, $5129; Sierra Nevada, $2987; Segregated Belcher, $830; Utah, $1096; Union shaft, $1130; Ward, $1474; Yellow Jacket, $7695.58.

Although the banks connected with the San Francisco Clearing-house will grant no more overdrafts, the mining companies will be able to secure accommodation as before, but it will be obtained by giving the companies' notes, signed by the presidents and secretaries, for the amounts of money agree upon.

At the annual meeting of the stockholders of the Best & Belcher Mining Company, 70,000 shares were represented, and the following officers elected for the ensuing year: George R. Wells, president; Charles H. Fish, vice-president; and H. Zadig, E. B. Holmes and William R. Sherwood, directors. L. Osborn was re-elected secretary and P. Kerwin superintendent.

The Company of Associated Stock Brokers of the San Francisco Stock and Bond Exchange have elected the following officers: George T. Marye, J. M. Shotwell, H. L. Van Wycke, A. W. Foster and George C. Hickox.

We build special styles of Air Compressors for every use to which compressed air is applied. Complete Catalogue free.

Clayton Air Compressor Works,

43 Dey Street, New York.

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(Successors to THOMSON & EVANS.)

110 and 112 Beale Street, S. F

MACHINE WORKS,

Steam Pumps Steam Engines

And All Kinds of MACHINERY.

DEEP WELL PUMPS

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY AND LOCATION.	NO.	AMT.	LEVIED.	DELINQT AND SALE.	SECRETARY.
Alta M Co, Nev	43	15c	April 25,	Aug 4, Aug 15	L Osborn, 309 Montgomery
American and Mexican M Co	10	2c	June 28,	July 31, Aug 19	F M Husted, 522 Montgomery
Best & Belcher M Co, Nevada	54	25c	June 6,	July 14, August 4	L Osborn, 309 Montgomery
Crocker M Co, Arizona	14	5c	June 5,	July 13, August 3	A Watermau, 309 Montgomery
Crown Point M Co, Nevada	61	25c	June 12,	July 18, August 8	J Newlands, Mills B'ld'g
Derbec Blue Gravel M Co, California	11	5c	May 31,	July 5, July 27	T Wetzel, 320 Sansome
El Leopoldo M Co, Mexico	3	5c	May 25,	July 1, July 20	Jabez Howes, 214 Pine
Exchequer M Co, Nevada	36	10c	June 29,	Aug 1, Aug 29	C E Elliot, 309 Montgomery
Gray Eagle M Co, California	33	—c	July 10,	Aug 16, Sept 14	C O Harvey, 309 Montgomery
Hale & Norcross S M Co, Nevada	101	50c	June 21,	July 27, Aug 18	A B Thompson, 309 Montgomery
Inyo Marble Co, Cal	20	5c	May 22,	June 26, July 20	W W Sargent, Mills Bldg
Occidental Con M Co, Nevada	13	10c	June 22,	July 26, Aug 17	A K Durbrow, 309 Montgomery
Peer M Co, Arizona	15	5c	June 8,	July 12, August 2	A Watermau, 309 Montgomery
Peerless M Co, Arizona	20	1c	June 15,	July 20, Aug 10	A Watermau, 309 Montgomery
Potosi M Co, Nevada	35	25c	July 11,	Aug 15, Sept 5	C E Elliott, 309 Montgomery
Red Jacket Cons M Co, Nevada	1	5c	May 24,	July 15, August 5	S M Capp, 415 Montgomery
Savage M Co, Nevada	61	25c	June 20,	July 25, Aug 14	E B Holmes, 309 Montgomery
Silver Hill M Co, Nevada	33	5c	May 29,	July 5, July 28	D C Bates, 309 Montgomery
Utah Cons M Co, Nevada	18	10c	June 16,	July 18, Aug 5	A W Havens, 309 Montgomery
Weldon M Co, Arizona	7	5c	June 15,	July 18, Aug 9	A Waterman, 309 Montgomery

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Beoton Coo M Co, California	Annual	V B Alleo, 538 Sacramento	July 20
Carmelo Coal Co, California	Annual	W T Baggett, Mills Building	July 17
Dora G M Co, California	Annual	J. Blumenthal, 415 Montgomery St	July 27
Lady Washington M Co, Nevada	Annual	L Osborn, 309 Montgomery	July 28
Live Oak Drift M Co, California	Annual	F Chappelet, 315 Montgomery	July 22
Savage M Co, Nevada	Annual	E B Holmes, 309 Montgomery	July 20
Union Con M Co, Nevada	Annual	C E Harvey, 309 Montgomery	July 17
Yellow Jacket M Co, Nevada	Annual	W H Blauvelt, Gold Hill	July 17

DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE
Bulwer Cons M Co, California	5	L Osborn, 309 Montgomery	Oct 20
Champion M Co, California	10	T Wetzell, 310 Pine	May 15
Cons New York M Co, Nevada	10	C E Elliott, 309 Montgomery	Feb 15
Great Western Quicksilver M Co	25	A Halsey, 328 Montgomery	Oct 8
Mayflower Gravel M Co, California	10	D M Kent, 330 Pine	June 30
Pacific Coast Borax Co., California	1 00	A H Clough, 230 Montgomery	Jan 10
Standard Cons M Co., California	10	J W Pew, 310 Pine	July 25

NOTICE!

Bids are Asked until September 5th, 1893,

For Constructing the

ESCONDIDO IRRIGATION SYSTEM

Estimated cost, $200,000. Write for particulars.

A. J. WERDEN.....Secretary.

Escondido, Cal.

PATENTS

BEST LEGAL ADVICE. BEST PATENTS OBTAINED.

DEWEY & CO.,

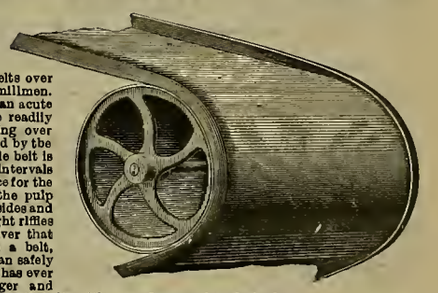
220 MARKET ST., SAN FRANCISCO,

WASHINGTON, D. C., LONDON, ETC.

THE BLASDEL CONCENTRATING BELT COMPANY.

We are now having our new Improved Concentrating Belt manufactured in San Francisco. We keep always on hand Belts suitable for the Triumph and Frue machines, but can make any length or width desired. The advantages of these belts over *any others* will be readily seen by practical millmen.

First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers; thus the vexation and loss caused by the frequent breaking of the flanges of the old style belt is practically done away with. Again, our belts, at intervals of two to four feet, have a very slight rifled surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it from banking on the sides and forming channels through the center. These slight riffles also save very fine sulphurets and the quicksilver that would otherwise escape with the tailings from a belt, the surface of which is entirely smooth. We can safely say that it is a better concentrator belt than has ever been manufactured. It will last much longer and will handle more pulp. We also manufacture smooth belts with same flanges when desired.



H. G. BLASDEL, Jr., Manager, 419 California St., San Francisco.

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S. F. MECHANICS' INSTITUTE MEDAL

To DEWEY ENGRAVING CO.

This Silver Medal was awarded for the fine display of HALF-TONE PHOTO-ENGRAVINGS in the Dewey Engraving Co's exhibit showing the progress of Half-Tone and Photo-Relief Engraving on this coast—the Dewey Engraving Co's Establishment being the first to introduce photo-engraving on this side of the continent, in 1877.

SUPERIOR ENGRAVING.—This able and reliable firm, through long and practical experience and thorough knowledge of the special requirements of all trades and classes desiring engravings on this coast, possess superior advantages in accommodating all Pacific States patrons of the Engraving Art.

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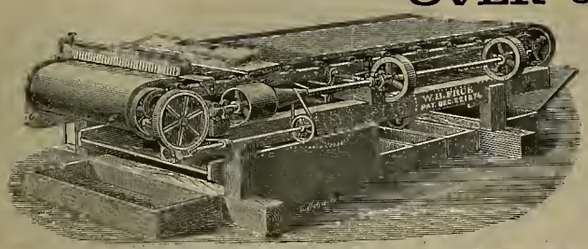

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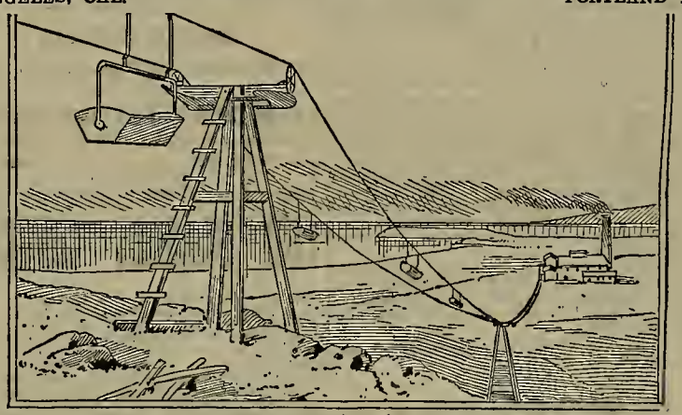

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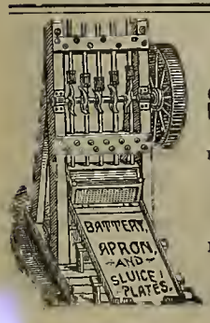

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Drift Mines of the Forest Hill Divide.

In certain districts in the State the ancient channel system, together with its dividing ridges, was completely covered by a broad lava-cap or mantle prior to the starting of the modern channel system. There appears no definite indication of such a mantle in the district described by Mr. Ross E. Browne, in the State Mineralogist's report; on the contrary, the presumption is against it. Had the second period been closed by a broad, flat-topped lava-mantle, completely covering the earlier divides, one should expect to find the modern channel independent of the cement channel in its course, occasionally cutting and occasionally avoiding the same without a very definite guidance, and leaving as much of the old lava-capped divide as of the cement channel to form the present ridge. Such, however, is not the case on the Forest Hill Divide. The prospecting shafts and tunnels have invariably developed the existence of a trough-like depression under the volcanic cap. The ridge for 26 miles, from Tadpole to Peckham Hill, shows under the cap a practically continuous depression in the bedrock surface. There is good reason for regarding this as the main cement channel of the district.

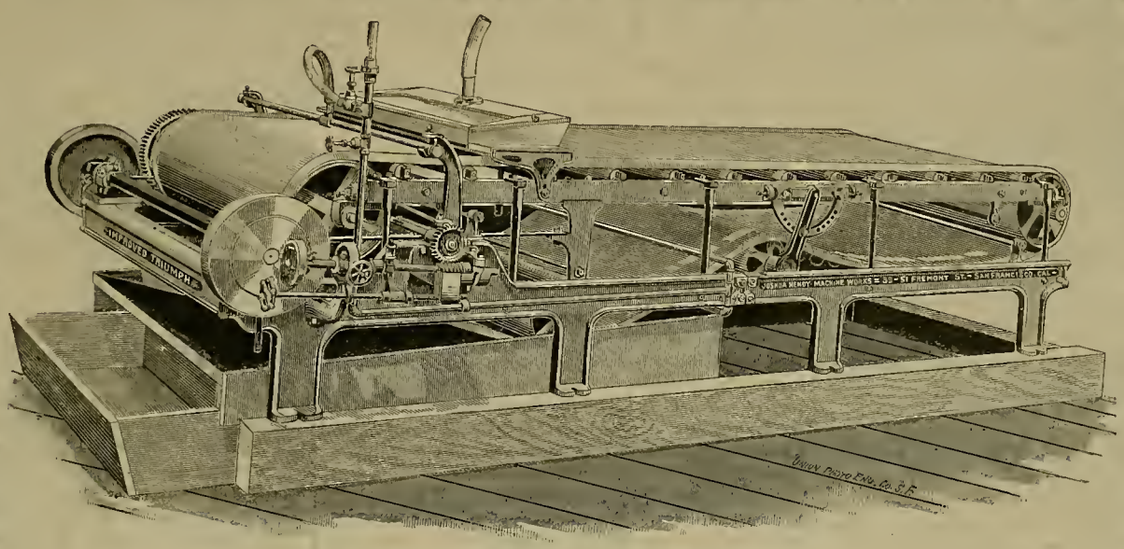
It is difficult to establish satisfactorily the cause which led the modern river to avoid the older cement channel to so marked an extent. In picturing the periods, it has been assumed that the old river bed, or rather the valley, was filled with volcanic material to a level high up on its widespread rims, but not to actual overflowing; that the thick volcanic mud formed a more compact conglomerate of the heavier debris in the central line of flow, and a lighter and more sandy cement toward the shore lines; and that these conditions tended to divert the streams toward the marginal lines of the deposit. The streams would necessarily cut across the deposit at the junctnre of the volcanic-capped tributaries.

There is offered no definite evidence in support of this assumption. It is made, in defanlt of a better one, with the view of impressing the fact that the old cement channel has been avoided, to a notable extent, by the channel of the modern rivers.

It is plain, however, that the construction of the ancient systems is very far from being so simple.

The following section (Fig. 8) shows the height of the present bedrock ridges. The rims of the old river bed have not yet been developed.

Owing to small irregularities there is required the development of a considerable length of the channel to determine satisfactorily the average grade. However, disregarding the smaller tributaries, the exposed sections show, as a rule, a fair uniformity of grade—certainly as great a uniformity as the modern river beds. The accompanying longitudinal section of the divide shows the grades of the summit-line, and of the ancient and modern channels, and the depth of erosion. The course of the ancient river was more sinuous than that of the ridge-line, hence the grade in the section is somewhat greater than the actual grade.



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These advantages are obtained by reason of the fact, as will be observed from the cut, that the crank-shaft is now placed and fitted at the head of the concentrator, clear of the belt and in direct view of the operator or attendant. This, of course, greatly facilitates the oiling of the bearings of the shaft and connecting-rod, and precludes the possibility of any sand or detritus, passing over the belt, from reaching or getting into the bearings.

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Fig 8. HEIGHT OF PRESENT BEDROCK RIDGES.

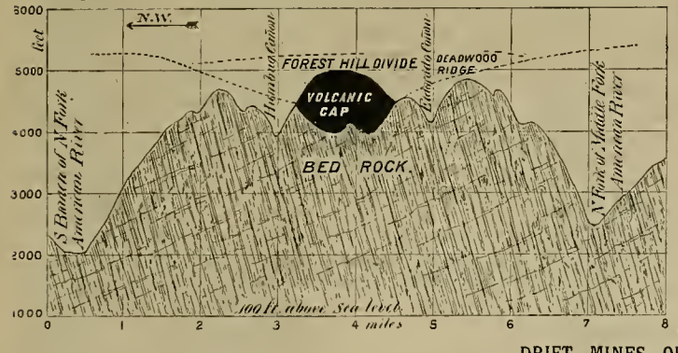
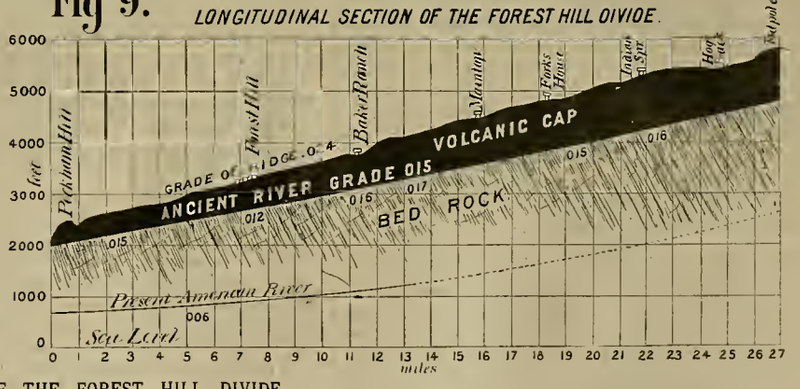


Fig 9. LONGITUDINAL SECTION OF THE FOREST HILL DIVIDE.



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W. B. EWER. }
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San Francisco, July 22, 1893.

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Comment.

They had a miners' meeting up at Park City, Utah, the other day, to decide whether the miners of the Ontario and Daly companies would accept a reduction of 20 per cent in wages or quit. Mr. Chambers had a talk with the men at the mines and told them if they would accept a reduction the mines would continue to work; otherwise, as the companies are losing money, it would be necessary to close down. At the meeting a large number of the men took part in the discussion and every speaker was listened to with fair attention. Some were in favor of no reduction whatever nor of listening to any reason why a cut should be made, while others cautioned moderation and maintained that the conditions were extraordinary, and that what the mine officers had to say should be given due consideration and carefully weighed. The two factions clashed rather harshly several times and some sharp language passed between many of the men. The discussion lasted for more than two hours and the chairman was quite often taxed to the utmost limit of his resources to maintain order and guide the meeting to a successful termination. Finally a committee was appointed to wait upon Superintendent Chambers and lay the case before him in plain and concise language, that the men had decided to accept no reduction, and demanded the old wages or nothing. Afterward a second meeting was held and the committee was authorized to go uninstructed to Mr. Chambers, which was much the wiser plan on the part of the miners. A quarrel with bread and butter in a mining camp in these trying days is a very foolish proposition. The miners ought to encourage owners to keep the mines in operation, even at some cost to themselves. This is much better than to see them shut down entirely.

The sweeping reduction in salaries and expenses about to take place on the Comstock comes none too soon. The salaries of officials should have been cut down some years ago. The whole outfit has been running on a top-heavy system which has nearly wrecked it. Some of the stocks have been selling lately a rate for a whole mine of less than the mine really had in the treasury. There have been in many instances, some of which we have quoted, more officials than working miners employed. Now not only the officials but the miners must feel the pinch, for wages as well as salaries are to come down. As will be seen by a statement in our Mining Summary in another column, there are now only 325 miners at work on the Comstock at $4 per day. It is thought, if they will accept $3 per day, 1000 men can be put at work. It is pretty certain that this reduction will take place. As there are so many idle miners in the country, there are plenty who will be glad to get the $3. They are all in want of employment. The Miners' Union has doubtless seen this coming for a long time. The members will naturally not want to accept this reduction, but it is better for them to do it than quit work altogether. The Comstock mines have such a good proportion of gold in their ore that they can be worked under more favorable conditions than most silver properties. But they cannot, under present circumstances, keep going on any extensive scale and pay the salaries and wages now being paid. The question has been put off long enough, bnt must now be faced. The salaried officials have signed an agreement, and other reductions are expected to follow.

The silver situation, as far as it relates to mining, could not be much worse than it is. Silver mines, mills and smelters have shut down in all the principal camps and districts of the country, and thousands of men are out of employment. There is, moreover, no immediate prospect of mines or works starting up again. Congress cannot settle the matter in a week, and even then may not settle it to the satisfaction of the silver-mining community. Of course the closing down of the silver mines and reduction works exercises a widespread influence in the regions where they are, and thousands of people not directly connected with the industry are affected. Conventions, mass meetings, leagues, etc., are considering and discussing silver all over the West, but their deliberations are looked upon as not carrying great weight by reason of the participants being directly interested in silver production. All they can do is to present their side of the question to the general public. The matter will rest with Congress eventually. After the great Silver Convention in Chicago, its members will adjourn to Washington, to be on hand when Congress convenes. The real fight on the subject will commence then. What is being done now is merely preliminary; a sort of skirmisbing before the great battle in Washington.

Some day the placers along the Santa Maria, near the bonndary line of Yavapai connty, will he worked profitahly hy means of improved machinery. Where men are now panning out the golden dust, soon hydranlic jacks will be in fnll blast. There is a large extent of country along this stream which is rich in anriferous gravel.—Mohave County Miner (A. T.).

This paragraph is from a paper which always has a column or two of well-prepared mining news about the various mining camps of its vicinity. If such a paper supposes auriferous gravel to be worked by "hydraulic jacks," what must be the idea of hydraulic mining held by papers printed in agricultural regions. There is a very decided difference between a hydraulic jack and a hydraulic nozzle. A jack could lift a very heavy weight if properly applied, but could not do much with a gravel bank. The definition of hydraulic mining in the California Code is as follows: "Hydraulic mining, within the meaning of this title, is mining by means of the application of water, under pressure through a nozzle against a natnral bank." We have more hydraulic mines in this State than anywhere else in the world, but we have not yet been able to move those auriferous banks by means of "hydraulic jacks."

We have before referred to the prospecting operations in a cross-channel of the Mayflower mine on the Forest Hill divide, Placer county, where they are boring through the lava and gravel with an ordinary artesian-well apparatus. We learn this week from Mr. Chappelet, president of the company, that the fourth hole bored is now down 375 feet. They recently passed through eight feet of "nigger-head," which is a very hard material, as most miners know. Mr. Chappelet says every one was surprised at the tools being able to pierce this material as well as they have. They are confident now that they can get through anything they meet. Where boulders are met, blasting is resorted to, otherwise they bore right along. This system of finding the depth and centers of gravel channels under the lava cap has often been suggested, but this time practical experience shows that it is not only feasible, but cheap. The expense is comparatively little. Four men carry on the work in two shifts. They are not only prospecting the channel, but one of the holes will ventilate the main tunnel of the Mayflower. This mine is now paying very well, the gravel in the channel being of high grade.

A Gold Run correspondent of the Placer *Herald*, in discussing the necessity of the resumption of hydraulic mining, brings to the argument some very surprising figures. He says:

"California at one time produced one-third of the entire gold of the United States; thus, by our mines being closed, one-third less gold is coined in the United States. In 1880 this State alone produced $10,000,000 in gold; this went floating over the entire world. Last year she produced about $600,000 in gold, a difference of $9,400,000. As a matter of fact that much less was coined and more gold was leaving our conntry than was coming in. In a period of 45 years California sent rolling through the world $1,300,000,000 in gold, nearly all taken out by hydraulic mining. Cnt off this enormous amonnt, and is it any wonder we are financially depressed?"

There is not a figure in this statement which is correct except as to the total amount of gold produced, and even a statement in that connection is wrong, for this was not nearly all from hydraulic mining. The surface placers and quartz furnished most of it. In 1880 this State produced $20,030,761 in gold; it has never got down as low as $10,000,000, even with the hydraulic mines closed. The gold product of California last year was $12,571,900, not $600,000, which is quite a material difference. The very first sentence in the statement is misleading, for the correspondent says: "At one time California produced one-third of the entire gold of the United States." The fact is, this State still produces over one-third of all the gold of this country. Out of the $33,000,000 gold yield of this country last year, California produced $12,571,900. Such figures as those in the *Herald's* letter are worse than useless and do no good to the hydraulic-mining cause. Matters are bad enough without useless exaggeration.

We may expect more news of strikes in gold properties in these days, because so many miners are now prospecting for the yellow metal. Even in the silver States gold is now receiving the most attention as far as mining is concerned. Miners everywhere are hunting for it. In many instances there will be exaggeration of values, because men not accustomed to gold-mining are apt to get excited over a few rich specimens or a dozen or so colors in a pan. Those old in the business, however, know that it is the average which has to be looked to, and pay little attention to a glittering specimen.

It is impossible for the PRESS to publish the proceedings of the various meetings and conventions held of late in favor of silver. The result is similar in each case—the adoption of resolutions in favor of free coinage and against the repeal of the Sherman Act unless other favorable legislation takes its place. Some of the resolutions adopted have been in very vigorous language, by which the West threatens the East. Whether action of this sort helps the silver-mining business is questionable, to say the least. The speeches in Colorado have been particularly fiery. If many of the delegates have the ideas which have been expressed at some meetings, the silver convention at Chicago before Congress meets will be rather a lively one.

The Chief of the Bureau of Statistics reports that the exports of gold from the United States during the twelve months ended June 30 amounted to $108,689,844 and the imports to $21,174,381, an excess of exports of $87,506,463. During the preceding year the exports were $50,195,327 and the imports $49,699,454. The exports of silver for the year ending June 30th were $40,737,319 and the imports $23,193,252, an excess of exports of $15,544,067. During the preceding year the exports were $32,810,559 and the imports $19,955,086, an excess of exports of $12,855,473. These figures show that our exports of the precious metals are very greatly increasing, especially the gold. Our domestic production of gold is now only about $33,000,000 per annum and if this export proportion keeps up it will not take long to rnn our stock of gold down very low. It is evident that we are buying too much abroad, for this gold goes for foreign purchases.

The California Debris Commission.

The members of the California Debris Commission, appointed by the President to carry into effect the Caminetti Act, left this week for a tour through a portion of the hydraulic mining regions of this State. They will go to Placer, Nevada, Yuba, Butte and Plumas counties, and examine both large and small mines. The object of this trip is to meet and confer with the practical working miners at their mines, examine into the conditions existing, and ascertain if possible why no applications for license to mine by this method have been made.

The fact is that, although the commission has been organized for work for the past six weeks, thus far not a single application for license to mine, in proper form, has been made. Several miners have applied to mine, but none of them have accompanied their petition with the instrument required by the law granting to the Government the right to regulate method of impounding the debris.

So instead of the Commission being overcrowded with work, it has none at all to do. To find out the reason of this is one of the objects of the members of the Commission taking this trip through the mines. Particular inquiry will be made among the smaller hydraulic mines, and the men will be given an opportunity to talk personally with the Commissioners if they desire.

The Commission will doubtless find that the main reason why the miners do not apply for a license is that they have no money to build dams. Their business has long been nnder the ban, and they have become impoverished. Moreover, there is some doubt as to the character of the restraining works which will be required by the Commis-

sion. Some men suppose a $20,000 dam will be required or a $10,000 dam, but this is absurd. The Commissioners cannot tell on advance of application for license what kind of a dam is needed. It is the duty of the miner to describe his proposed works, and the Commission will pass upon the plan. They will naturally regulate this in proportion to the magnitude of the claim and the amount of gravel to be washed. They are not apt to order dams out of all proportion to the profits to be made by their use. It was not appointed to annihilate hydraulic mining, but to rehabilitate it, and will doubtless try to do this and aid the industry as far as is consistent with their other duty of preserving the navigable streams.

Gold Mines

Gold mines, claims and prospects are now forcing themselves to the front all over the Western States and Territories. They have long been neglected because fewer sudden and great fortunes are made in them than in silver mines. Twenty or thirty years ago the gold-miner was the man of fortune; but of late years the bonanza millionaires have been those whose fortunes have been made in silver.

But with the fall in value of silver there comes a change in this. The silver-mining industry has received a blow which will never permit it again to occupy the position it has held. The metal itself has got into politics, which is bad for it, as this is bad for individuals. Should the action of this country and other nations again raise the value of silver, there will be no way of predicting when a change may be made at any time, or what the results may be. There will always be more or less doubt about the advisability of putting large sums of money into silver mining for fear of some such change, and silver properties are not likely to bring former prices under these circumstances. This is not a pleasant conclusion to reach, and it will be denied by many, but it forces itself to consideration under present circumstances.

One difficulty with gold mines in the past has been that because it was gold being mined, people supposed all sorts of extravagancies could be indulged in. In this State we found out the fallacy of this position many years ago, but in other regions where gold mining was newer, the same experience had to be gone through.

In working a gold mine, experience has shown that the utmost care must be taken in attention to details to prevent loss. As a general proposition there are few of these mines which carry large bodies of very rich ore. Where the ore is very rich there is comparatively little of it, and ledges with rich bunches are usually of a pockety nature and not at all steady as to product. It is the large ledges of ordinary ore which pay the best. It is surprising how low a grade of ore can be made to pay in these days. This class of mining, when conducted on a proper system and with economy, pays very well, indeed. In California gold-mining is carried on as a legitimate industrial proposition, just as wheat-growing or manufacturing. There is little, if any of the speculative feature left.

Speculation in mining has been mainly confined to silver properties on this coast for a long time. Not half a dozen California gold mines have appeared on the list of stocks dealt in by our mining exchanges. As a speculative proposition or stock-dealing operation a gold mine is found to be of little use to the brokers or dealers. They can do much better in silver, so that silver has always had the call on the stock boards.

People who have supposed that because of the Pine-street mining stock speculation in this city California mines were largely dealt in, are mistaken. Most of the stocks represent Nevada silver properties. The gold mines of California which are being worked are operated by companies or individuals and the stockbrokers never hear of them.

But the gold mines of this State have been heard of outside our borders and their value is better appreciated elsewhere than by the citizens of our metropolis. For instance, here is an item from the Mohave County *Miner*, published at Kingman, Arizona:

> Quite a number of White Hills miners came in Saturday night and have gone to the gold fields of northern California, and many more will soon follow their example. The gold fields of Arizona will support quite a large population when they are opened up, but at present they are in a state of neglect and very little work being done. In and around Cerbat there are many valuable mines of gold-bearing rock that could be profitably worked under the right kind of management. Ore that will mill from $10 up in gold can be found in abundance, and if silver fails to go to the front these mines should be worked or this part of Arizona will have to be given over to the buzzard and coyote.

Here are miners who are coming from a region where there are undeveloped gold claims to a State where such mines are being worked, or where, if they find available prospects, there is now a chance for a sale.

The gold belt of this State is very extensive but it is by no means opened and developed. There are hundreds and hundreds of known claims only partly developed, and some thousands of "prospects" which may become mines if money is expended to prove their worth. There is no mining field in the United States where there are such opportunities as can be found here. The miners and prospectors, however, need the aid of capital to develop these properties, and it is evident that this aid will soon be at hand.

The Hydraulic Miners.

There was a meeting of the executive committee of the State Miners' Association last week, which has stirred up the anti-debris men and brought forth the usual batch of resolutions from the Anti-Debris Association. The Marysville *Democrat* dignifies the mining committee meeting by naming it a "convention." All sorts of things are reported as having been done at this meeting, among others that there is an organized movement by the miners against the dams, against filing a petition, against the penalty clause, and against the whole bill.

Now the fact is, the executive committee of the Miners' Association met last week and discussed the new law, but no action was taken with relation to asking for amendments to it, reports to the contrary notwithstanding. Members of Congress were asked to be present, as their advice was desired in the matter of making the law operative, which it apparently is not now, as nobody has properly asked for a license to mine under its provisions, although they all want to get to work.

It is found that few of the smaller miners have the means to build dams. They are also in doubt as to the character of the dams which will be required and are waiting for the first few to comply with the specifications of the engineers. Moreover, there are some questions as to the instrument demanded by the law on relinquishing to the Government the right to specify the character of the restraining works, it being supposed by some that this would throw a cloud over the title.

It was these matters which were discussed by the members of the executive committee, and a committee was appointed to devise and report on some means to overcome the difficulties in the way of seeing this new law put in practical operation. This committee is still at work and has not reported, so that no definite action has been taken by the association.

It may be said that the hydraulic miners of this State do not expect or intend to dump their debris so that it will interfere with or injure the farming lands or navigable rivers. The time for that sort of thing has long gone by. They must restrain the debris whether they want to or not and are trying to find some way by which they can do it. No steps will be taken by the miners which will injure the navigable rivers or farms. If any attempt should be made to amend the Caminetti law it would probably be in the direction of making it operative, not nullifying it. The fears of the opponents of hydraulic mining are entirely groundless in this respect.

Coast Industrial Notes.

On Saturday last the flour-mill and warehouse of the Fresno Milling Co., at Fresno, were destroyed by fire. The loss is $139,500; insurance, $48,000.

The Uncle Sam Gold-Mining Company has been incorporated with $10,000,000 capital stock in 100,000 shares. The directors are D. B. Hunt, Thos. Edgar, E. Wilson, Geo. P. Gillis and Fred Frankenthal.

A telegram from The Needles states that $450,000 worth of bonds of the Nevada Southern Railway branch line from Goff's have been sold in New York, and it is thought the work will be pushed on to Pioche and Goode Springs at once.

The wholesale wine firm of Lachman & Jacobi is to be turned into a company. The capital stock is placed at $1,000,000 in shares of $100 each. Directors: Frederick Jacobi, Abraham Lachman, Jacob J. Jacobi, M. S. Eisner, Samuel M. Newmark.

Charles Bernard of Carlin, Nev., is soon to begin work on his marble mine or quarry near that place. Mr. Bernard sent some samples of the marble to Salt Lake City and they took as high a polish as the finest quality of Italian marble. The quarry is situated on Maggie creek and is quite near the railroad.

A partial organization has been formed at Redding to sink a well in Buckeye township to prospect for gas and oil. A committee was appointed to select a spot at which to bore. A fund has been raised at Redding for the purpose, and if indications amount to anything oil and gas will be found. Fifteen hundred dollars has been subscribed.

Work has been commenced on the grading for the new power-house of the Mission-street and Potrero electric roads, controlled by the Southern Pacific Co., under the names of the City Railroad and Southern Heights and Visitacion Valley Railroad Companies. The new power-house is to be at the junction of Bryant, Channel and Eleventh streets.

On Wednesday night they had a disastrous fire at Susanville, Lassen Co. Sixty houses were burned. Not a business house was saved, with the exception of one eating-house. All the stores are a total loss except that of Sol Nathan, who saved one-half of his stock. The loss is about $250,000, not over one-fourth covered by insurance. Five entire blocks were burned. There were no casualties.

The stockholders of the California Electric Light Company were well represented at the annual meeting. Out of 50,000 shares, 42,000 were represented. The old board of directors was re-elected without the least opposition. The board consists of George H. Roe, Gustav Sutro, John S. Spring, D. Marcucci, Arthur W. Moore, P. B. Cornwall and William Kerr. The directors organized and elected the following-named officers: Pres., John R. Spring; Vice-Pres., George H. Roe; Sec., J. R. Green; Treas., The Nevada Bank.

Delegates representing 248,000 coal miners in various parts of Great Britain met in Birmingham, Wednesday, to consider the proposal of the mineowners to reduce wages 25 per cent. After a lengthy and heated debate a resolution was adopted declaring that the conference was opposed to the reduction. No decision was reached on the question of a strike if the mineowners persist in the intention to make the reduction. The strike, should one occur, would be the largest movement of the kind that ever took place in the United Kingdom.

The Mint Bureau succeeded in getting offers of silver in Washington on Wednesday at what it considers a fair market price—71½ cents per ounce. Four hundred and fifty-four thousand ounces of silver were offered for sale to the Treasury on that day at .71500 to 73. Seventy-five thousand ounces were purchased at .7150, the balance being declined. This makes the total purchases of silver for the month thus far 1,023,000 ounces. The gold reserve has recovered the ground it lost Monday and again began its climb toward the $100,000,000 mark.

At Leadville, Colo., orders have been received to take out the pumps from the great Maid and Henrietta combination. The shaft is nearly 1000 feet deep. Pulling up the pumps means the entire abandonment of one of the largest silver-producers in the State, with prospects that the water will rise to within 300 feet of the surface. This means that every drift and level will be flooded, entirely ruining the present workings, upon which $1,000,000 has been expended. Flooding the mine also means flooding the properties lying below it. It is impossible to estimate the damage it will cause.

The internal dissentions that have brought the San Francisco and San Mateo electric road so prominently before the public lately are in a fair way of being terminated. The business of the road is good, and the mechanical operation as well as the physical conditions are satisfactory, and all in all the troubles besetting the men who have risked much in the enterprise seem to have reached a turning point. The profits have averaged $5000 per month for the past six months. Branches are to be built to Golden Gate Park and to Baden when the stockholders and creditors settle their differences.

The new electric road on Twelfth street, Oakland, was put in operation this week, and cars will be run regularly from Twelfth and Broadway to West Oakland. The cars ran very smoothly over the route, and the road is pronounced a success. The single fare each way will be five cents. This road will now make lively competition between Broadway and West Oakland, as four lines now parallel each other. There is an electric line on Eighth street, one on Fourteenth street and another on Sixteenth street. The power for the new line is furnished by the Oakland Consolidated Cable Company.

The various departments at the Mare Island navy-yard are busily engaged in getting up plans and estimates for work proposed to be done during the coming year. From appearance it would seem that considerable will be done in the way of improvements at the navy-yard. A number of projected plans will be submitted to the department for approval and recommendation made that they be adopted by the next regular session of Congress, tending to increase the efficiency of the already efficient plant. Not the least will be the request for another dry dock, to be located near the site of the present magnificent structure, which may well be said to be one of the very best in the country.

At San Bernardino, Judge Campbell of the Superior Court has refused to dissolve the injunction in the suit of Alice Marlett, administratrix, against the Bear Valley Irrigation Co. Plaintiff owns a timber claim through which the Bear valley people began to dig a ditch for the purpose of conveying water to the Alessandro tract. Damages were demanded, but were refused by the company as they were deemed excessive. The company then undertook to construct the ditch without the permission of the owners and the authority of the court was invoked. The ditch being constructed will cost several hundred thousand dollars, and the granting of the injunction is a serious matter not only to the company, but also to the users of water.

The Metropolitan Railway Co. has received the first four electric-cars of an installment of ten which the Carter Bros. Car Works of Newark are building. The new cars are of the double-ender pattern, with the front and rear dummy both open and capable of seating eight persons on each. The cars are much larger than those now in use on the Metropolitan system running from Powell and Eddy streets to the park. Wendell Easton, president of the Metropolitan Railway, said that it was the intention to improve the service, and that additional machinery would at once be placed in the power-house, and with the additional power the running-time from Market and Eddy streets to the park would be shortened from 24, as at present, to 20 minutes.

Three of the ice houses at Prosser Creek, Nevada county, have been destroyed by fire. These houses were filled with ice, about 8000 tons in each, and the loss in each will amount to about $60,000, while the loss to the buildings will be equally as much more. This will make the supply of ice very short this season, as it had been predicted that the demand was going to exceed the sup-

ply. Just what effect it will hsve on fruit icing is unknown, as the Union Ice Company had intended to supply their orders for export sbipments from these houses. The People's Ice Company hss shipped out of their houses some 600 cars. The Tahoe has emptied one house of 8000 tons and still hss one filled. The Old Floriston is open now and tbey are shipping ice out. It contained some 8000 tons, while their new house has about the same amount. Tbe National Ice Company has about 8000 tons in tbeir house and Rocky Run will ship about 5000 tons.

AFTER Mondsy next, tbe hours of the men in the railrosd sbops at Ssersmento will be reduced from nine to eight, as a measure of economy and to esve laying some of the men off. One of tbe officisls of the Southern Pacific says: "The compsny hss given out orders to cut down the expenses 25 psr cent. This should not be understood to mesn, however, that the compsny's force is to be cut down that per cent. The company sets sside so much of its receipts for betterment work—that is, for improvements that are not imperative, but yet would incresse the value of the company's property if msde. The compsny hss felt the effect of the stringency in the money market just as otber lines of business have felt it. It hss found a scsrcity of gold with which to meet the demands of otber roads, etc., and those of creditors generally. Yet tbe business of tbe compsny shows that the receipts are good. The difficulty expcrienced by other firms in getting gold to meet payments is whst has sffected tbe company and brought about tbe present order respecting expenses. That it is to be but temporsry in effect I sm certain."

THE ownership of the waters of Carson river, Nev., is now the subject of a very important lawsuit. For many yesrs Csrson river hss furnished the motive power for driving the mills crushing the ores for the Comstock mines. Of late years, however, the waters of the river have become of great value for irrigating purposes, and in consequence an irrepressible conflict has grown up between the farmers and the millmen. The Union Mill and Mining Co., a corporation controlled by the Sbaron estate, hss brought ejectment suits in tbe United States Circuit Court sgsinst 105 fsrmers of Ormsby county, Nev T. D. Edwsrds has been appointed a commissioner to tske testimony, and the hesring hss been going on for several dsys at the offices of W. S. Wood, Nevads Block. Tbis csse is a test one, as the present action will also determine the rights of the other milling companies. T. W. Coffin, of Virginis, Nev., snd W. S. Wood, of this city, are the sttorneys for the mill companies, wbile ex-Attorney-General R. M. Clarke and W. E. F. Dsal appesr for the farmers. Both sides claim prior sppropriation of the water. Ten years ago tbis suit would have excited profound interest in this city, but tbe decline of mining on the Comstock hss enormously decreased tbe importsnce of tbe Carson river to the mining industry.

MR. F. M. SMITH, known here as the "Borsx King," tbis week assumed control of the Oskland Consolidsted Street Rsilway. A special meeting of tbe directors wss held, st which Msyor McElrath and A. T. Eastland retired and A. H. Clough and W. H. Chickering were elected to fill the two vacancies. Mr. Chickering is Smith's attorney and Mr. Clough is his secretsry. The directory of the road is now constituted of W. H. Martin, G. W. McNear, J. W. Coleman, W. H. Chickering and A. H. Clough. This is but the final step in a long series of deals in the stock of this road, by which the control passes absolutely to F. M. Smith, wbo uow alone holds 10,000 sbares more than one-half of the stock of the road. The Oakland Consolidated is one of the most prosperous systems in Oakland. The main line commences at Second and Brosdway and runs tbence to Franklin street, thence to Tbirteenth, thence to Grove and thence to Forty-fifth street. Here the road branches and makes a loop, tsking in Temescal, Berkeley and Lorin; tben there is another branch rosd which goes to Mountsin View Cemetery. The third hrsnch leaves tbe msin line at Sixteenth street snd runs to the Sixteenth-street ststion. Recently anotber new branch was placed in operation, whicb leaves the main line at Grove and Thirtesntb streets, snd runs thence down Grove to Eighth, to West Oaklsnd. The system is a very complete one and tbe rosd is said to have been a psying investment from tbe start. Smitb and his collesgues still have another big scheme in view. It is proposed to build an electric road from Piedmont, to start from tbe foothills down to Emeryville to connect with the new ferry to be established. Tbe syndicate is said to have tbe absolute control of 25 miles of street railroads and the option of 10 miles more. There are many plans on foot for a great ferry scheme, but the promotors are not yet ready to give their plans in detail. All the roads that bave heen secured by the syndicate are so arranged that the psssengers can easily be transported to Emeryville. It is said, on very good authority, that it is proposed, wben all the deals are consummated, to establish a great ferry system bstween Emeryville and San Francisco. A passenger will be taken from the center of tbe town to San Francisco via Emeryville for less money and in sborter time than is now done by the Southern Pacific. The syndicate, with its $6,000 000 or $7,000,000 capital, proposes to do great things for Oaklsnd, so it is said. The roads in contemplation will be built if satisfactory franchises can be secured from the County Supervisors.

Electric Haulage in Coal Mines.

The problem of economic haulage in coal mines has lately received considerable attention from mine owners, who have found the expense involved in haulage alone much greater than in their opinion it should he. The mule has had his day as the principal factor in the haulage question, and the cable is under test, with results more or less satisfactory. The electric locomotive for mine work is comparatively a new-comer in the haulage field, hut it has already acquired considerable prestige and hids fair to supersede hoth the mule and rope haulage.

An excellent example of the work done by the electric locomotive in coal mining is shown at the Rock Springs coal mine, at Rock Springs, Wyoming. This plant was installed by the mining department of the Northwest General Electric Company, and is described in the *Electrical Review*.

About a mile from the mouth of the mine the horse power station, containing a dynamo of 80-horse power driven by a steam engine, is located. Current from this is delivered at a pressure of 550 volts, which allows of a drop of about ten per cent between the power house and the mine.

The feed or supply wire is No. 000 hard drawn bare copper, making a complete metallic circuit. The trolley line is furnished with a circuit breaker about 30 feet from the mine mouth, so that the current may be cut off from the mine when the locomotive is employed for switching purposes outside.

The locomotive used is of the G. L. M. General Electric Company type, of 30-inch gauge, 60-horse power. Its usual speed in this instance is about eight miles an hour. The cars used are of the ordinary coal mine type, weighing each, when filled, about 3000 pounds; when empty, about 1000 pounds.

The economy attained hy the use of this locomotive is str k'ngly illustrated by the fact that by its aid 30 cars were run from the loading point to the end of the track, a distance of about 6000 feet, there dumped and returned to the mine in 20 minutes. On another occasion the locomotive drew after it 30 loaded cars and pushed ahead 16 others from end to end of the road without difficulty. The track is built of 35-pound T rail, and has several switches and spurs necessary to the rapid handling of the cars.

It is not inapropos here to quote from a letter from an expert, giving an account of contact with the hare wire and the results thereof:

"Several men have heen shocked since our plant began operating, hut the effect is only momentary, and they only laugh at it. The result has simply heen to remove all fear they had of it. As I stated in my letter, this is a very dry mine, and so the only way one can get shocked is to stand on a rail and touch the wire. I have been shocked several times myself while handling the locomotive, through carelessness. The other day a balky mule ran right into the wire with his head He was knocked down. He got up and ran into it again three times, and was dropped in every instance. After that he simply turned around and walked off to his work. I ought to remark that the shock does not knock a man down or burn him. The only description I can give of its effect, from personal experience, is a tingling sensation, lasting, in the heaviest shock I received, not more than two minutes afterward in the hand that made contact."

This last is a fact which should reassure mine owners who have any fear of danger from contact with the trolley wire. The element of danger once recognized as entirely absent, the electric locomotive can compete on equal grounds with any other system of haulage, with many points in its favor which cannot be urged by its competitors. We expect to see its adoption become general, hoth on account of the economy of its operation as well as its convenience of manipulation.

A Letter from an Old Miner.

Whisky Creek Mining District, Shasta County.

TO THE EDITOR:—In many places in California, no doubt, there are certain mining fields which, for some cause unexplainable, remain unworked and unexplored. And, perhaps, within the entire State there is no other place with the surface mineral showing that Whisky Creek Mining District has, hut what has had done, or is now having done more work in the way of prospecting and developing, than has been done here. With the exception of one or two claims this is a dead camp, so to speak, while on every hand there are favorable showings for rich and permanent mines.

There are also in this camp several quartz clalms which are fairly opened, and tapped at from fifty to one hundred and twenty-five feet, that are now underworked, and things around them as silent as the grave. This, in some instances, is not because the rock is not rich enough to pay for working in some form or another. In this regard your correspondent knows of one particular claim on which a well-to-do farmer of Sacramento valley expended some four thousand dollars in the way of development, and has on the dump considerable good free-milling ores. Not long since, the farmer concluded to shut down bis mine, and, if possible, try to sell the same. To-day the claim has the appearance of an ahandoned piece of property.

Now, the claim is well worthy of different treatment. It is tapped hy tunnel and shaft about 125 feet, and the ledge at this depth is something near four teet in width, and is stoped out each way sufficiently to show that the ore found in it is not a mere pocket. It is safe to say the rock will mill twenty dollars per ton, and it is a fact that the rock is richer at this depth than it is nearer the surface. I only mention this particular instance to show the alarming *ennui* there seems to exist in running affairs not only in this hut in other mining fields. What this camp needs is new life infused into lt. There is a chance here for capitalists to invest a little of their cash with a fair prospect or reaping a rich harvest in return, and I have no doubt there are other camps in the same predicament.

This mineral belt is the same as that of Old Diggings, French Gulch and Deadwood. It is a large porphyry belt, running northwest and southeast. At this particular locality in it the creeks and gulches have been very rich in quartz gold, and in some places the gold leading up to quartz, its mother deposit; while at the head of this creek is that rich and strange quartz deposit known as the Bangheart mine, a thorough description of which was published in the MINING AND SCIENTIFIC PRESS several years ago. Near this old Bangheart mine is a claim that in former years paid handsomely, but which is now idle, and, in fact, the old mill put up on this claim many years ago is just now being hauled away to another mining section. The claim alluded to is known as the Mad Ox. Now, the supposition naturally arrived at is, that this ledge has "petered," or the gold exhausted, while the facts do not warrant any such conclusion. There is, perhaps, a "jump" in the ore shoot, but the mine has not been properly prospected. There is every reason to believe that when that is done the mine will yield up its gold in greater abundance than it did in former years.

And here, still, is another instance of this idle and do-nothing business, that is surprising to a man of energy. Near the town of Stella, or more generally known as Whiskytown, there is a large out-cropping of quartz, which in former years, paid to work in places, as the saying goes, that has remained unworked and undeveloped for many years. The showing is this; not long since a lower tunnel was run in this great quartz deposit and the ledge is found to be something like sixty feet in width, and at this point showing a different character of ore from that found near the surface. While it is somewhat refractory, yet a great deal of it is quite rich, and there is no doubt but what there is a sufficient body of rich ore to justify the erection of extensive reduction works on the same. But no, this ledge like the others mentioned, is a dead mine perhaps, for the simple reason tbat its owners are unable to go ahead and properly develop the same to a permanent basis. We allude in this case, to the "Old Phœoix Mine." And thus in like manner, we mlght mention many other similar instances In this camp, now so dead and lifeless, where all is required is a little capital and a reasonable amount of energy to make them rich and prosperous mines.

In conclusion we will remark that this Is a good field both for the prospector and the mining capitalists. Any letters of inquiry, touching this subject, if addressed to the initials hereunto subscribed, will he promptly and truthfully answered. Very respectfully,

Stella P. O., Shasta Co., Cal. J. P. W. D.

The New Gold Camp at Calmalli Lower California.

TO THE EDITOR:—The Calmalli mines, which are owned hy the Ibarra Gold Mining Co., recently incorporated in San Francisco, continue to improve greatly. The active prospect and development work has been going on night and day for tbe past year without intermission, and the mines look more encouraging as the exploration work is pushed forward. The success of the new camp is more than assured. It really looks very flattering to the oldest and most conservative mining men. Out of the five mines on which active operations are being pushed forward (four of them having quite extensive workings), not one shows any sign of weakening. Over 1000 feet of work has been accomplished.

The La Plaga and Otilia mines have the deepest workings, the former having a shaft 200 feet deep and the latter nearly 300 feet deep. The two shafts are located on the same vein and are about 1500 feet apart. All the ore from the two mines is precisely the same. The vein averages from one to three feet wide, and is of a ribbon-like character throughout all the shafts and drifts in the mines. At some points the vein is of a low-grade character, but the high-grade rock is in excess of the low-grade. All of the quartz, heing milled just as it came out (not a pound of it heing thrown away), showed a net average milling yield of nearly $17 per ton, gold hullion. The method of treating the ore was simply battery crushlng and amalgamation through a 10-stamp mill; therefore, it is a reliable sample of the rock hanging in the stopes. No rock has been extracted outside of the shafts and drifts; it is hanging in the reserves ready for stoping. About 100 men (Mexicans) are employed in and about the mines, and an additional force of men is to be put on while the 10-stamp mill is being enlarged with new machiuery and everything got in readiness for running.

Experienced California mining and millmen have the management of thls work in hand, and, at best, it will be some time before the details can he completed, as everything will be put in first-class running order.

The directors of the company owning the newly developed mines of Calmalli are elated over two hig strikes which have just heen made, one being in the San Juan and the other in the San Francisco mine. The first strike was made in the San Juan mine while sinking the new double-compartment vertical shaft, which is located north of the old workings. It was intended to tap the ore bodies which have already heen developed in tbe old workings. The shaft had only got through grass roots when a four-foot hlind ledge of quartz was cut which has an average free-gold milling value of from $15 to $20 per ton. Some of the specimens yielded are remarkahly rich. A few feet helow the large vein another vein a foot wide and of the same grade of ore was cut, it followlng the shaft for 30 feet when it finally dipped out. It had no sooner left the shaft when a third vein made its appearance. After cutting through the new one it proved to be a cross vein over one and one-half feet wide, cutting across the slate strata, the other veins and everything in its path. The average milling grade of the ore is over $25 per ton free gold; drifts will be run to prospect this extraordinary new cross vein as soon as the shaft is extended a little deeper.

From the bodies of high-grade quartz which lie in the old workings 50 to 100 feet deep, and to the south of the new shaft, the possibilities of the future outlook of the mines of this camp seem great, hut now, after these unexpected new ore shoots have heen struck in the shaft, they seem greater.

The other strike was made in the San Francisco at tbe 50-foot level. A 20-foot cross drift was run with the resnlt of cutting a two-foot vein of high grade ore. It is not yet known just how high this ore will average, hut it Is safe to put it at a very high figure. Yours very truly,

FRANK DAVIS.

Pocket Mining.

NUMBER III.

Free or Decomposed Pockets

The professional pocket-hunter, when he finds a trace from a free or decomposed pocket, goes to work tracing it up in the followiog manner: He first ascertains by panning where the gold lies; whether on top of the ground in the grass roots, or down deep in the soil, or on bedrock. When he finds out where the gold lies, or, in other words, where he gets the biggest prospect, he then pans across the trace to find the center. Gold, on account of its great specific gravity, will work down hill in the same course from the pocket as water would from the same source, and when he finds the center of the trace, which he determines by the prospect he gets in the pan, the largest prospect always being in the center of the trace, he then closely examines the gold in order to find out whether he has more than one kind or not. When he is satisfied that he is getting only one kind of gold he tries a panful from the center of the trace farther up the hill. If the trace is a slim one and he only gets a very light prospect in the center of the trace, say three or four small colors to the pan after panning carefully to save everything that has greater specific gravity than the dirt, particles of broken rock, etc., he closely examines the result in order to find out what goes with the gold. He does this so that he can follow that mineral, which comes from the pocket also, should the gold give out entirely in the trace before he reaches the pocket.

To find out what mineral comes from the pocket with the gold, he pans across the trace the same as he did to find the center. If he gets a coosiderable amount of any mineral substance or crystals in his pannings in the center of his trace and does not get on either side, it invariably comes from the pocket or from the ledge that gives the pocket, so by following what comes with the gold, when the gold gives out, it will lead to the ledge, at the point where the pocket exists. When there is one or more kinds of gold in the trace it shows that there are two or more traces run together, or lapped over each other, and coming from as many different pockets.

Sometimes the second gold found in the trace comes from a seam or ledge running parallel with the trace, which gives out a little gold all along, and on which the pocket exists. Oftentimes prospectors who are inexperienced and cannot always tell pocket gold, work on what they suppose is a pocket trace when in reality it is gold thrown off from one of those blind ledges or seams that run in an up-and-down-hill course and give out a little gold all along, and does not "pocket" at all.

When there is sufficient gold in the trace to follow, and the largest amount is on top or in the grass roots, the prospector follows the gold until it gives out and then drops back and finds the feeder or "spur hole," or where the gold goes into the ground as it were, which leads him to the pocket. If he fails to find the feeder without disturbing much of the ground in the vicinity of where he thinks the pocket is, he then cuts a trench down to bedrock, up and down hill, at the end and in the center of the trace, commencing a little below where the gold gave out and extending it up above where he got the last gold. By doing this he cuts across the ledge or seam which gives the pocket, and then it is an easy matter to find the feeder on the ledge. Should he fail to find a ledge or seam in his trench, which should extend up and down hill far enough above and below where his gold gave out, to cut the ledge if it runs crosswise of the hill, theo he digs aoother trench at right angles with the first one, a short distance below where the gold gave out, and in this trench he will cut the ledge if it runs parallel or nearly so with his trace.

In this manner he is sure to fiod the ledge, and when once found it is an easy matter to find the spot where the pocket is. I have seen places where prospectors had followed up traces until the gold gave out, and then dug hole after hole and tore up the earth in such a manner that it would be almost impossible for the next prospector who came along to find out where the gold gave out. When such prospectors fail to get the pocket, it is a soft snap generally for the professional who comes after him, for half the work is already done for him and he goes to trenching and soon finds the ledge which the first man has dug holes on both sides of, but did not happen to dig one on the ledge.

In many places the ledges crop or give out considerable float, and in such cases the pockets are mure easily found. At the point where the pocket occurs the ledge is generally more or less decomposed, and in most cases it carries a large amount of iron oxide. The stringer or ledge that invariably comes in through the country rock and contacts with the ledge at the point where the pocket occurs, is generally largely composed of lime, iron, copper, or manganese.

If it is composed largely of quartz, or is a quartz ledge or vein, it will be found to carry one or more of those minerals in large quantities.

In the northern counties of California above Shasta, and throughout southern Oregon, the contacting seam or stringer is generally lime. It is invariably white and oftener in a chloride form than any other. This combination of mineral which exists in pockets of this class only decomposes the ledge where the pocket occurs, and the ledges in nine cases out of ten are barren of gold eighteen inches and two feet on either side of the pocket. Sometimes a color of gold cannot be found six inches on either side of where the decomposition ends. Those pockets mostly occur in soft, yellow porphyry which contains a large percentage of lime and iron and is prolific in small stringers of quartz and llme. When the prospector is hunting for a trace, and he finds this soft porphyry formation, he forms his ideas as to how the ledges run. Then he commences panning around the base of the hill, point or ridge, taking his panfuls about 25 or 30 feet apart until he pans around the base of the hill. If he does not find a trace then, and still believes that there are pockets above, he goes a hundred yards or so farther up the hill or rising ground and pans around the same as before, so that if there should be a trace above that did not reach down as far as the foot of the hill or point, he will catch it in his second panning around the hill.

Many pocket-hunters follow this method. They find out where there has been a short gulch that paid well to placermine, and, when they find out at what point the pay quit, they pan on either side of the gulch on the sidehill until they find where the gold came into the gulch and then follow it up to the pocket or to where the pocket has been. In most cases, where the short gulches have been rich, the pockets which fed them are all out and gone; but if the pocket-hunter once finds the ledge where one of the principal pockets came from, he then has the main key to the situation. He follows along the same ledge, for it is likely to pocket in another place. Then, again, it often occurs that where the pocket is broken away and gone down into the gulch, there is one or more still existing underneath where the first one was. If he does not find a trace on either side of the gulch, and there is a little gold still in the gulch, he follows the gold until he finds where it leaves the gulch and follows it up the hill until it leads him to where it originally came from. I know where traces, and what would be called slim ones at that, have been followed for over half a mile to a pocket amounting to no more than $50; and in one particular case in southern Oregon, I followed a trace over three-fourths of a mile and found the pocket.

ALEX QUARTZ.

A Banker's Opinion of Hydraulic Mining.

Mr. John McKee has written a letter in which he urges assistance to the hydraulic mining industry. Mr. McKee is manager of the Tallant Banking Company of this city and president of the San Francisco Clearing-house Association. The San Francisco Clearing-house Association is composed of the following members: The Bank of California, Bank of British Columbia, the Bank of British North America, Donohoe-Kelly Banking Company, the First Natlonal Bank of San Francisco, London and San Francisco Bank (limited), the Sather Banking Company, the Anglo-Californian Bank (limited), Wells, Fargo & Co., the Nevada Bank of San Francisco; London, Paris and American Bank (limited), Tallant Banking Company, the Crocker-Woolworth National Bank, Grangers' Bank of California, American Bank and Trust Company, Bank of Sisson. Mr. McKee's letter is as follows:

Editor Daily Report.—SIR: In reply to your inquiry you may say that in common with others interested in the development of the material resources of California, I should he very glad indeed to see the new laws affecting the hydraulic mining industry put into speedy practical operation, so that these mines may resume work at once. That the stoppage of these mines seriously affected the gold output of this State there can be no question; and that we need all the gold we can get there can also he no question. The gold in those gravel hills is an available source of supply which we ought to draw upon as soon as possible.

California stands pre-eminent as the great gold-producing State of the Union, having led all others in this branch of mining ever since the first discovery here. Out of the aggregate of $33,000,000 in gold yielded hy the mines of the United States last year, California alone produced $12,571,000 of that metal, or over one-third of the total. The next highest gold producer of the States is Colorado, which during the same year turned out about six and a half millions. This shows how far above the others our own State stands in gold product.

That California is still able to maintain its position so far in the first rank in this respect, notwithstanding the closing down of its producing hydraulic mines in the Sacramento and San Joaquin river drainage basins, should be a cause of congratulation, especially now when so many silver and lead mines are closing down all over the country. But this should make our citizens use every effort not only to maintain this annual gold product, but to increase it. That it can be increased by the working of the auriferous gravel deposits is plain, and the recent legislation shows that there is evident desire on the part of the State and Government to see these mines again in operation.

The State has, through its Governor and the Legislature, asked Congress to assist in the rehabilitation of the hydraulic gold mining industry of California, and Congress has complied with the request to the extent of passing a special law and providing a special commission of engineers to carry it out. The miners themselves must pay for the impounding works required under the new law, no appropriations having been made for any such works. The miners are merely given permission to work under certain restrictions. Many of them, I am told, will not be able to build these works, from lack of means, their mines having been long closed down, and therefore profitless. Moreover, the members of the Engineering Commission, having many other important duties to perform in connection with river and harbor work, are unable to give more than partial attention to the mining question.

This is to he regretted and it is to be hoped that measures of relief will be asked for and applied. To rehabilitate an industry so long dormant will require active steps on the part of all its advocates and the citizens of the State should lend such assistance as they can. The possible addition of eight or ten millions of new gold which these mines could turn into the channels of commerce and trade every year, if they were all at work, would make a very decided difference in our financial and industrial situation in this State.

San Francisco, July 11, 1893. JOHN MCKEE.

A MAN'S LABOR IS CAPITAL.—All prospects that look like they may make a mine do not develop into one. It takes capital to develop a prospect into a mine. A man's labor is capital. Why all this noosense about Eastern capitalists being bitten in mines? If they put money into a developed mine they can measure its value the same as corn in a crih. If they will not take the pains to find out what they purchase, they are not business men. If they purchase a prospect, they have no guarantee that they will get their money back; yet on the other haod they may reap a rich harvest hy the expenditure of a little money. The man who has the real risk is the one who seeks amid the recesses of the mountains for the metals. He risks his life, and, if he finds nothing, his time has gone for naught. He may locate good-looking prospects and spend years opening them up, with his limited means, only to find that there is no pay in it. Eastern people do not put money in mines only for expected gain, and, if they lose occasionally, it is no more than the prospector and real miner does. Is it not a fact that they win oftener than they lose; that millions taken from the Western hills finds its way into the pockets of Eastern men?—Mohave County Miner.

On Behalf of Silver.

The Appeal of Colorado for Its Chief Industry.

The Committee on Resolutions of the Denver Silver Convention presented a report which was unanimously adopted. We print an abstract of the report, which is in the form of an address to the people:

"*To the People of the United States:*—The people of Coloradu, standing in the gloom of impending disaster, and representing in condition and sentiment the people of Montana, Idaho, Wyoming, Nevada, South Dakota, Utah, Arizona and New Mexico, with reverence for the Constitution and unswerving loyalty to the general Government, ask for your calm and candid consideration of the following facts before you give approval to the destruction of silver as money, and to the final establishment in this country of single gold standard values, and thus at one stroke change all debts to gold debts and inaugurate a never-ending rise of gold and a continued corresponding fall in the price of every commodity:

"Congress is called to meet in extra session August 7th. Preceding the call, the classes which struggled for 20 years to overthrow a himetallic money standard, provided by the Constitution, have inaugurated a paoic which they have untruthfully charged to the existing silver law, ignoring the facts that there are $300,000,000 in outstanding legal tender notes, commonly called greenbacks, that are equally available with treasury notes issued in payment for silver, to draw gold from the treasury; that the balance of our foreign trade has turned against us, rendering settlement abroad with American gold a necessity, and the great bankers of Europe are purchasing gold with which to change the money standard of Austria and fill the treasury vaults of other monarchial countries. It is their evident purpose to create a prejudice against what is known as the Silver Purchasing Act, and, under pressnre, secure its unconditional repeal. * * * * *

"Suddenly, like a fire bell in the night, the news was flashed beneath the oceans that free coinage in India had been suspended, and the market price of silver fell within 48 hours fully 20 ceots an ounce. This startling action, forced upon the Indian Government without a moment's warning, was a step held in secret contemplation by the British Government for months, to be taken at a critical and opportune time, when the consternation it must create would stamp out the last phalanx of himetallism's defenders, and must have had as one of its chief aims the intimidation of the Senate to bring it in line with the subservient lower house.

"Immediately the wires were burdened with appeals to the President from banks and clearing-houses and commercial bodies dominated by them for an extra session, and to Senators to repeal the Sherman law, which, it was claimed, was responsible for the disaster. A call was made. * * * * * * *

"Unconditional repeal means striking from the laws the last remnant of legislation that secures coinage for silver. It fixes the United States firmly in the ranks of single-standard nations. It is the consummation of a conspiracy, organized at the close of the Franco-Prussian war, to destroy as money of ultimate redemption half the coined money of the world, leaving the other half to bear alone the vast mountain of credit upon which the world's business is conducted, inviting more frequent panics and rendering them more destructive and enduring. * * *

"The Sherman law is not the work of the silver-producing States. It was forced upon the country against their will. Their constant demand has been that of the agricultural States west and south and the working masses of the whole country. They had not sought to impose upon the country some new financial nostrum, but asked simply for restriction of the coinage laws as they were from the first year of the Federal Constitution until the furtive repeal of 1873. The Sherman law is the trick by which restoration was defeated. It was accepted by oimetallists as a pledge that the old laws should at some future time be restored, and they now demand, not that the Sherman law shall be retained, but that the hostage shall be redeemed hy the re-enactment in its stead of the coinage laws under which the country grew and prospered for more than three-quarters of a century. * * * * *

"They urge the old law with supreme confidence, born of the unassailable truths of history, that it will immediately place every coined American dollar upon par value, both as coin and bullion; restore the bonds of weakened love and confidence, and set in happy motion the wheels of all the country's magnificent industries. Will you listen to us while we speak in words of sober earnestness of the local effects of the unconditional repeal silver will have? The silver-mining States and Territories, embracing 1,000,000 square miles of this continent, with 2,000,000 Americans inhabiting them, depend pecuniarily upon silver mining for prosperity. This industry is the very heart from which nearly every other industry receives support. Agriculture will not thrive without artificial irrigation. The mines of coal, iron, stone and clay, while magnificently worked, with such dear labor and so remote from local markets would be feeble in movement and their operation would he disastrous without the stimulus the mining industry affords. It supports our foundries, operates our machine shops, supplies our railroads with freights, stimulates travel, keeps bright fires in the smelters and sends customers to the shops of our merchants. It has invoked in the valleys and upon the mountain-sides the magnificent cities and thrifty towns and villages. Great manufactories of paper, cotton, leather, iron, steel and clay distribute finished products and support thousands of prosperous and happy families, but because agriculture is so limited in area (confined to narrow strips along our few and scanty streams), our labor so high and handiwork so remote from other than local markets, coal is mined, coke burned, grain grown and fruit gathered, In main for the owners and workers of silver mines and smelters and the proprietors and workmen of the industries and callings dependent upon them. The reduction in the price of silver to about 70 cents shut down

99 per cent of the silver mines in the country and the smelters must soon follow their example.

"There are in Colorado to-day 15,000 idle miners who know not where to turn if work is not resumed. There will soon be added to this idle army of labor 4000 men from the smelters. The stone quarries are nearly all shut down. Railway companies are laying off train crews by the score. The foundries are nearly all out of orders; farmers and fruit-growers will be barely paid for the cost of raising crops; merchants will be countermanding orders and traveling men for Eastern houses will seek almost in vain for customers. This is no exaggeration. The destruction of the silver industry will devastate the country as if swept by a cyclone, reaching from the British possessions to the Mexican border line. This is a sorrowful picture of Colorado, with her mining industry destroyed, but represents the condition of other mining States and Territories with the same calamity upon them. If the silver mines remain closed half the American output of lead must be lost. The greatest bulk of the lead product is taken from silver-bearing ores. It requires one metal, supplemented by others, to remunerate the lead-silver miner. Not less than 55 per cent of the gold product of the country depends upon the maintenance of the silver industry. Placer or creek washing, the earliest and most prolific source of our gold supply, is practically exhausted.

"Those who contend for a gold single standard willfully mislead you as to the cost of producing silver. We say to you, in the most solemn and truthful manner, that reliable statistics prove, including but legitimate items in the account, that the silver of Colorado costs, by the time it is on the market, not less than $1.29 per ounce. Like gold, some silver is produced for much less than the market value, but the average cost of silver is fully the highest price it ever brought in the market. All the mining States and Territories are in the debtor class. Stop and consider, men of the East, how many millions of your money is invested with us. Funds of the estates of widows and orphans are loaned on our lands, and have built our edifices. Colorado has been a favorite field for such investments. Have the people of any State ever proved more punctilious in prompt repayment? The Legislature has enacted laws that are cruel to our people and unrivaled in liberality to creditors, that no man might shirk or escape the repayment of a borrowed dollar. There are held throughout the East hundreds of millions of dollars in railroad stocks and bonds, in municipal securities, in trusts and mortgages, the payment of the greatest body of which depends upon the prosperity of the silver-mining country. We of Colorado pride ourselves upon our commercial and financial integrity. No calamity can induce us to repudiate a dollar of honest debt. All our assets are at the will of our creditors for reimbursement, but if by bad Congressional legislation, if through Congress you shall wipe out the great industry of the section around which all others cluster for vigor and profit, the values of our properties will shrink, our business will be destroyed, our towns and cities will be largely depopulated, and the railroads traversing the western half of the continent will be sent into bankruptcy. * * * * * * *

"Colorado, great in resources, proud of her business record, filled with brave men and resolute hearts, makes this its appeal for preservation to the open-hearted and generous people of the country. We are confident that it will not be in vain. The atrocity of making homeless, through the destruction of the chief industry of 1,000,000 square miles of American territory, 500,000 men, women and children, with all the attendant scourges of enforced and hopeless idleness, can never be the work of an American Congress with your approval. In hope of a speedy delivery from the crushing burden of a financial system begotten of the greed of Great Britain's remorseless money power, and of the prosperity inseparable from the American system which includes free coinage of gold and silver at an American ratio of 16 to 1, we submit to the people of the United States this statement of our cause."

The Cyanide Process in South Africa.

A recent publication furnishes some material which will be of great value at the present time, when all Australia seems to be in doubt as to the wisdom of employing cyanide for the recovery of gold. It seems that during December, 1892, the tons of stone crushed at the Witwatersrand field was 114,000, and the large bulk of tailings which require treatment has led to several important developments. The first of these provides for the delivery without handling of the tailings into leaching tanks, and the erection of extremely large and substantial vats. At the Langlaagte Estate no less than 12,000 tons of tailings are dealt with per month, and the vats employed are constructed of cement, this material only absorbing an infinitesimal quantity of the cyanide solution. The extracting reaches 85 per cent., and the cost per ton averages 4s 6d. Additional plant is being provided to raise the total capacity of the leaching plant to 24,000 tons monthly. It will interest Australian readers to be told the plan on which these cement tanks are laid out and worked. According to Mr. G. W. Shaw the vats and sumps are built into excavations in solid ground, the upper part being level with the ground. A tramline runs over the center of five large vats, each holding 450 tons, and is used for filling them, while a steam crane, running on rails placed on each side of these vats, lifts and empties the tailings when treated into a movable hopper placed over two parallel lines of trucks and fills two trucks at each lift, at a cost of less than 2d per ton, including cost of crane, wear and tear and maintenance. The time taken to empty each vat is 14 hours. The cyanide solution containing the gold is led by gravitation into collecting boxes placed in a shed some 200 feet away, and thence falls into two cement and brick sumps. It is brought up to proper strength by the introduction of stronger solution and then pumped back into vats. The whole system is claimed to be economical and simple. The total cost of the plant, including rolling stock, etc., was roughly £25,000. The fact which impresses one is the great enterprise and ingenuity exercised at the Rand to secure the cheap treatment of the tailings. In this respect the chemists there offer a great contrast to most Australian professional men. Here the whole process is being received with mistrust, although in South Africa its success has been demonstrated a thousand times over. At the Salisbury cyanide plant for instance—a small concern—a tailing's wheel lifts the discharge from the plates to a flume, which carries it to a hydraulic separator, which separates the slimes from the coarse tailings. This, it is stated, renders the subsequent treatment very economical, as easy filtration is obtained when treating the tailings deprived of their slimes, and the valuable tankage space is not taken up by slimes. This mode of handling tailings could well be applied to some of our mines, and it is also proposed further to run the tailings deprived of their slimes direct into the cyanide vats with a view to saving handling. What is, however, of the greatest importance is that Mr. Bettel, of the Robinson mine, has completed a method for the rapid and economical treatment of slimes in a filter press, thus solving a most difficult problem.—Australian Mining Standard.

British Columbia Mines.

The Ores and Mines of Slocan District.

We take the following from the Nelson *Tribune:* The closing of transportation routes for the last three months has been a good thing for the mines in Slocan district. This will appear an absurd statement to the many who believe that a mine-owner who has ore in sight needs only to sack and ship it. But the few who are practical understand that, no matter how large the ore-body, a certain amount of dead work must first be done in a mine before ore can be shipped profitably. The time that has elapsed since the breaking-up of the sleigh roads and trails into Slocan district has not been lost by the owners of several of the best mines in that section. Instead of "gutting" their properties, in order to live up to their contracts with the teamsters, they have been running tunnels and drifts, making raises and sinking winzes; in fact, doing work that will enable them to ship ore continuously hereafter without robbing their mines. In doing this another thing has been proved—something that should give every mine-owner in West Kootenay renewed confidence—that is, that not a single property on which work has been done has the ore-body petered out. To-day there is not a mine in Slocan district, on which work is being done, which has not improved as depth was gained. It is not necessary to cite instances, but the following are given at random: The Washington, the World's Fair, the Bonanza King, the Bluebird, the Slocan Boy, the Freddy Lee, the Slocan Star, the Mountain Chief, the Alpha, and the Lucky Jim.

At the Washington the ore-body is larger than ever before; at the World's Fair and Bonanza King the main tunnel is in 225 feet, with the face in an ore-body fully ten feet in width; the Bluebird never looked better; the Slocan Boy looks almost as well as the Washington, of which it is an extension; the Freddy Lee can now ship ore without robbing the mine; the Slocan Star never shipped a pound of ore, and has hundreds of tons ready for stoping; the Mountain Chief has three tunnels, all in ore, some of it so rich that assayers are afraid their returns will not be believed; the Alpha has over seven feet of ore, and its owners do not know what price to put on the property; the Lucky Jim is a bonanza since last Friday, the day on which a 10-foot ore-body was uncovered by running an open cut. Development work is also being done on half a hundred other claims, such as the Wonderful group, the Read & Robinson group, the Young Bonanza, the Rico, the Idaho, the Canadian group, the Ruby Silver, the Snowstorm, the Whitewater, the Wellington, the Northern Belle, and the Duluth syndicate claims on Sandon creek, and assessment work on many more. It is safe to say that fully 300 men are working for wages within a radius of 12 miles of New Denver, and that an equal number are prospecting or doing their own assessment work.

It is not the fact that the ore-bodies are large and in place that gives the people of that section so much confidence, but their confidence is due to the fact that they know they have ore that can be shipped at a profit, even with the duty and heavy transportation charges against them. Probably in no other mining district in the world producing wet ores is the ore of so uniformly a high grade. As instances: The owners of the World's Fair and Bonanza King have 100 tons of ore sacked on the dump. From each sack a piece of ore was taken, and a sample of the 100 tons thus obtained gave a return of over $200 in value to the ton. The Mountain Chief ore is exceptionally high grade, assays running from 1635 to 2552 ounces in silver and from 63 to 81½ per cent in lead to the ton. The Washington has shipped 560 tons to the Selby Lead Works of San Francisco, from which the returns were over $75,000—more than enough to pay every dollar the owners have expended on the mine.

As the development work in Slocan district is all done through tunnels, depth is not gained as rapidly as when shafts are sunk. On the Washington the greatest depth is probably 300 feet; on the World's Fair and Bonanza King, 160 feet; on the Mountain Chief, 125 feet; on the others from 150 to 250 feet. On the Mountain Chief the upper tunnel is in 65 feet, the middle one 100, and the lower one 70. The face of the middle tunnel is now under the mouth of the upper one, and every foot it is extended will give 75 feet of stoping ground. The ledge is from five to seven feet wide, and the pay streak 18 inches of clean ore. Shipments will be resumed at once, the ore going out by way of Kaslo to the United Smelting and Refining Company at East Helena and Great Falls, Montana. The Mountain Chief is the most favorably situated mine, barring the Lucky Jim, in the district, as it is but a few hundred feet above Carpenter creek and less than two miles in an air line from New Denver. On the World's Fair and Bonanza King the main tunnel is in 225 feet. Two raises were started from the main tunnel, one reaching the surface in 69 feet; the other is up 40 feet, and 100 feet will yet have to be made before the surface is reached. Sixty-five feet from the mouth of the main tunnel a crosscut one was started. It is now in 65 feet and when through to the surface it will be used for a working tunnel. In running the 65 feet, two small veins were cut—one 14 inches the other 18 inches wide—and another and larger vein that crops out on the surface is almost sure to be cut in the next few feet. No stoping has been done. All the ore sacked and on the dump—100 tons of galena and 250 tons of carbonates—came from the tunnels and raises. As stated above, the galena runs over $200 to the ton; and from samples assayed, the carbonates will yield fully $100 to the ton. On Friday a great ore body was uncovered on the Lucky Jim by running an open cut a few rods from the mouth of the tunnel. This claim is so situated that the cost of getting its output to any wagon road or railroad that is built past Bear lake must be but nominal, for it is less than a quarter of a mile from the trail leading from the end of the Kaslo wagon road through Three Forks to New Denver. On the Washington the lower tunnel has not yet reached the ore body, but the main one continues in six feet of good, clean ore. At the Slocan Star the indications all are for a wonderfully big mine; and the fact that the Duluth syndicate has struck ore in an extension on the south side of Sandon creek goes to confirm the expressed opinion of many mining men, that is, that the Slocan Star ledge is one of the large and strong ones in the district. On the Alpha, one of the Grady group, the ore body exposed is simply immense in extent, and the ore the highest grade of any in West Kootenay district.

It must not be inferred from the above statements that the owners of these different properties have big bank accounts; for they have not. Every ton of ore shipped out of the Slocan country has paid fully $100 in the way of mining, transportation, duty, and smelting charges; and, from the present outlook, the cost is not likely to be reduced this summer. No one of the mines is accessible except by trails, varying in length from one to twelve miles, and ore cannot be packed over trails as cheaply as the unthinking imagine. Had the provincial government been a far-seeing one, every dollar appropriated for new government buildings would have been appropriated for wagon roads in our different mining camps, and the result would have been that instead of publishing the proceedings of indignation meetings held throughout the province, our newspapers would be chronicling within the year the output of mines in a hundred different camps in Kootenay, in Yale, in Lillooet, and in Cariboo.

Estimating Cost of Special Machines.

A machine tool manufacturer, whose product is known in every civilized country, said recently that he had about decided that it did not pay to undertake to build a machine embodying new ideas. Concerns having the requisite facilities, says the *Iron Age*, are frequently requested to estimate on some large machine of special design intended for a particular service. The machine is unlike anything in the market and the applicant desires to know in advance what it will cost. Long experience had proved to the satisfaction of the builder referred to that it was impossible to estimate the cost of that particular machine and be just to himself and his customer. There were always difficulties which could not be foreseen and provided for, and which appeared during the entire progress of the work.

Trouble begins in the drafting room. It is very seldom that the drawings presented are so complete and accurate as to admit of their being sent directly to the shop. In the vast majority of cases the prospective builder is expected to provide such drawings as he may need, and in some instances he is required to furnish a complete set. To tell in advance how much labor this may require is out of the question; it is only possible to form a rough estimate and charge accordingly. That this is by no means an insignificant factor of the problem may be judged by the fact that in some cases the bill for drafting amounts to more than ten per cent of the total cost of the machine. Sometimes the builder is only furnished a rough sketch of the principal features of the machine. He is expected to supply all the missing material, and, if necessary, to design such parts as proved to be beyond the ability of the purchaser. For this work he receives no pay.

When the drawings are presented in a fairly complete shape, so as to convey a clear idea of the design, there is comparatively little difficulty in forming an estimate of the cost of the patterns needed. In addition, there is very little danger of loss by reason of inaccuracy in this department. The same cannot be considered as holding good in the foundry, especially if some of the patterns are intricate and difficult to mold. The loss here may be considerable, and even the exercise of the utmost care will not insure perfect castings every time. In this, as in other work, the risk is greater if the pattern is radically different from the ordinary run of work done by the molders. For his own protection the builder is compelled to recognize this and provide for it in his estimate, but he is at a loss to know exactly what to charge for what we may term contingencies.

In the machine shop there is less difficulty, and if the other departments could be calculated with the same degree of confidence the problem would be simpler of solution. But it may be that the machine under consideration will require the use of a tool not in the shop. Should this tool not be needed regularly, the work must be done elsewhere.

Another phase of the question is this: Three manufacturers are requested to present bids for building an expensive machine of new design. They spend considerable time and perhaps some money in making their estimates. We will suppose this expenditure to be the same in each case. One man gets the contract—the others suffer loss. Should the two who fail to get the work be recompensed for their trouble? We are well aware that this point has been freely discussed, but we do not know that any attempt has been made to obtain pay for this work, which is practically thrown away.

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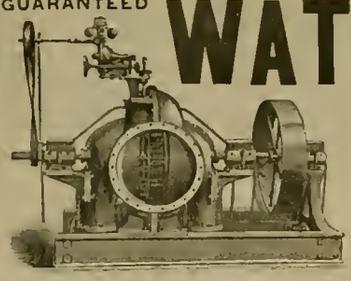

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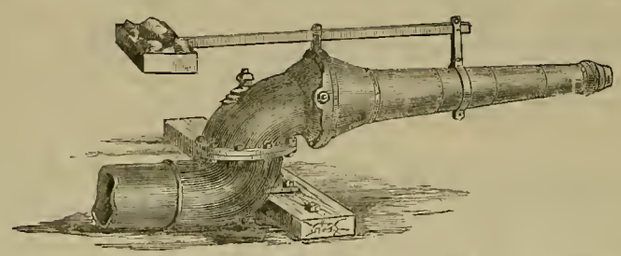

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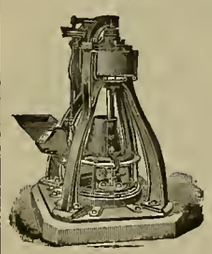

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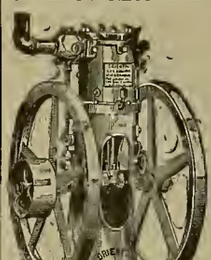

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Triple-Expansion Engine Economy.

The triple-expansion engine of to-day, says *Industries and Iron*, is undoubtedly a step in advance from the view of keeping up the steam pressures, but it is very far from being accurately demonstrated to what extent this is an economical advaoce. The demaod for higher pressures of steam, and hence the larger range of expansion, has had the effect of causing manufacturers to seek for an engine which, to their mind, was best suited to the purpose of utilizing the pressures thus obtained; but there is a great difference of opinion even among eogioeers as to the triple-expansion engine being the best for all purposes. It has seemed almost impossible for the compound engine to be worked with high pressures oo account of the great range in temperature in its cylinders during expansion, but if makers are put to it some means might be devised, with little trouble, to get over what does not seem to be an insurmountable difficulty. The steadily increasing use of the spleodid adjunct to steam cylinder efficiency would then come into more general favor, for there can scarcely be a second opinion that the steam jacket, when properly used, effects a large saving, although in the haods of the careless it is only a large consumer of coal, and hence detracts from the engine efficiency.

What are the media usually placed round the walls of the cylinder to prevent this great loss of heat? With the use of such a substance as asbestos or its kindred competitors it would he impossible to so clothe a cylinder as to prevent a loss of heat to the extent of ten degrees only, for although asbestos will, to a certain degree, retain the heat due to the walls of the cylinders, it caonot increase the temperature at a point two or three feet away, and, therefore it must prove a failure. Air, heated to a temperature as high as the funnel gases, will in like manner fail, owing to the difficulty experienced in causing it to properly circulate, and also on accouot of the quick manner in which air gives up its heat, it must prove itself detrimeotal to retaining the heat from the surfaces over which it passes. There is, really, therefore, only one medinm left, and that is steam. Steam can be applied in two ways—firstly, either by sending it through the jacket in a quick circular motion—a spiral would be the best—or, secondly, hy allowiog the jacket to remain full of steam and only draining off the water as it accumulates, and here arises what may be considered the crucial point.

To drain off only the water is at once a difficult and tedious task, aod numerous so-called steam traps are very difficult to manage and keep in working order. They are apt to "stick up" and so prevent the proper working of the valve. The use of a drum with a gauge glass in the front and connected at the top with the jacket and at the bottom with the condenser, although more reliable, is scarcely worth the thought, as it requires as much attention as the main boilers do to keep the water steady, and at the present day, when the numher of hands carried on a vessel are so few, it cannot he wondered that engineers on watch condemn anything which is likely to add to the number of parts under their control. Two questions, therefore, present themselves: Cannot a good automatic steam trap be designed to meet the case, and can nothing be done to help forward the re-introduction of the steam jacket?

With regard to the first question, no doubt it will be urged that there are many efficient steam traps in the market, and there is little doubt as to the truth of this statement, but it is invariably found that even the best are likely to get out of order when used at sea, consequent, no doubt, on the dirt and suspended matter which is usually found in the feed-water and the condensed steam from the jacket. The movement of the valve is also usually so small as to cause "scoring," and thus leakage is produced. To engineers ashore this is of little moment, as when it is found that the trap is not working properly, it would be put out of work to he overhauled when steam was down for the night. With the marine engineer, however, it would mean that the trap would have to be taken apart, possibly under circumstances which would reoder the matter far from easy, and it may be, in cases where there are very few engineers, after the completion of a long watch. Under these circumstances we need not be surprised that steam traps are universally condemned in marine practice, and owing to the want of a thoroughly reliable one the marine engine is handicapped over and above what it should he.

As regards the second question, there is little doubt that the despised steam jacket must again come to the fore, especially as pressures tend to increase. Those who have had to do with the working of triple-expansioo engioes at sea know full well that the economy of the engine depends mainly on the ability to get a good proportion of the full power out of the engioe, for when the power in the triple-expansion engine is reduced there is present with the steam large quantities of water, sufficient to cause it to he felt in the cylinders, aod hence erroneously attributed to priming.

Heating Boilers with Refuse.

An interesting scheme (which, if carried into effect, will be the first attempt on a practical scale to utilize house and town refuse in the heating of boilers for the production of electricity for illuminating purposes) is suggested by the engineers to the St. Pancras Vestry, which was the first local authority in London to establish a central electric light station on its own account. At the present moment the Vestry's station is capable of supplying 10,000 incaodescent lamps simultaneously, correspondiog to 13,300 lamps iostalled, and of which 11,000 have been installed during the 18 months that the station has been in operatioo. The prospects of the demaod for light largely increasing are favorable, and the engineers suggest that a second generating station should be erected, and worked with great ecooomy by the use of refuse destructors. It is proposed that this station should be combined with, and be built on the same site, as works for collecting house aod street refuse, the buroing of such refuse and the utilization of the heat obtained from such burning for the generation of electricity and for other purposes. The principle of the destruction of refuse by destructor cells is now well recognized, and is being adopted by various local authorities in the United Kingdom. The scheme provides for the laviog down of generating plant to supply 4800 lamps iostalled, ample space heing allowed for future extensions. At the commencemeot, three engines of 200 horse power aod three boilers would be installed; the boilers would be heated by the gases from the destructors passing round the outer shell and escaping by the main flue, crossing under the front eod of the boilers to the chimney. The power available from the destructors will not be less than 300 horse power, with the first installment of three boilers, and 500 horse power with a complete set of five boilers. Arrangements are also provided for firing the boilers with coal in the usual manner by hand, or by the use of mechanical stokers, so that steam may be more rapidly raised to meet any sudden demand due to fogs and at times of maximum load. It is belleved, if the scheme is carried into execution, as seems probable, that it would not ooly yield a remunerative return in the supply of light, but that the expenses incidental to the present method of disposing of the refuse would be considerably reduced.—Electricity.

POWER FOR SMALL ENTERPRISES.—The supply of power to small enterprises for special occasioos has long been a missing factor in our humbler industries. Those that are not financially equal to the expenses of an ordinary power plant are by no means so limited as some suppose, while the disadvantages are too keenly felt to require comment. It would seem that the escape lies in the direction of electricity, especially in our cities and larger towns, where electric lighting is permanently established. In this sense the electric motor is destined to be the poor mechanic's friend. Its management and control is simple, its service is in direct and immediate command, it requires no licensed engineer or fuel, and in economy of space occupied has no competitor. In some instances where needed for intermittent use, power can be furnished at one-tenth to one-fifth of the cost of steam. It has found its way into plumbing, metal-spinning and machine shops in New York, and as an economic factor, with the other advantages named, there can he no grave question as to its more general adoption. We predict the rentiog of electric power to yet become a remunerative and general enterprise.—Age of Steel.

THE relative efficiency of the hammer and the hydraulic press is a question which has been hotly discussed by experts. Ahout a year ago some very interesting experiments were made at the Arbel forges at Rive-de-Gier in France, which failed in their immediate object, which was to establish a defioite ratio hetween the weight of a hammer and the power of a press required to do the same work, but which nevertheless shed some light on this subject. The general conclusion reached was that forgings made under the hammer showed a finer grain aod a greater degree of uniformity in texture than those made with the press. It was noted that while hammer forgings showed a better surface, the press forgings had a greater density in the center. These experiments, while their general indications favored the steam hammer, were hardly carried far enough to he conclusive.

Scientific Progress.

Do Doctors Spread Contagion?

The surgeon and the obstetrician utilize the means that experiment and observation have proved necessary to render their work aseptic. In case of the entrance of disease germs, they take prompt means to destroy them, or to neutralize their effects. It behooves us, who practice among children suffering from contagious diseases, to inquire if we are equally careful.

The snrgeon about to open an abdominal cavity removes all possible sources of infection from his patients person and environment, and goes to his work with clean linen and clean hands. Do we do likewise?

Some time ago a promioent operator sent me an invitation to witoess an abdominal section, adding in his note, "provided you have not visited a case of scarlet fever or other contagious disease during the last 24 hours." I could not but thiok, if such precaution is necessary to insure the safety of this patient, what are the risks to the little children that I shall visit after seeing the case of scarlet fever or other contagious disease, and whose systems are fertile soils for the poison to develop it?

The danger of such conveyance is great, as physicians with large family practice know, and many, like myself, have been taught the lesson by sad experience. I can recall several instances in which the children of physicians have fallen victims to scarlet fever and diphtheria, the cause being clearly traced to disease brought home by their fathers.

Let me illustrate this danger by a description of a physician's visit to a case of diphtheria. The doctor enters the house, removes his hat, overcoat and gloves, and is shown into the room containing the patient, and comes ioto direct contact with the atmosphere loaded with the germs of the disease. His hair, woolen clothing, hands, etc., must more or less ahsorb the poisoo, in his stay of about 15 minutes. What does he then do? He replaces his overcoat, carefully buttoning it up, as if to keep as many of the germs as possible warm and well protected. He puts on his hat as he crosses the threshold, jumps into his carriage, covers himself with robes, and drives to his next patient; enters, takes off his hat and coat, and woe to any little ones who live in that house! The doctor has probably that with him which will more likely kill than cure.

What should be done to diminish this danger? Stay no looger in a house containing a contagious disease than is absolutely necessary. Don't remove your hat or unbuttoo your coat in that house. After examining the patient, go down stairs, preferably at an open door or wiodow, and give directions for treatment. The family of the patient will respect you for the care you exercise when you explain the reason. Drive without covering with robes to your next patient, and be sure that patient is not a child. Never allow a messenger from a case of contagious disease to call or wait for you in your office. Instruct him to bring written messages and leave them at your door. If the messenger wishes to speak to you, tell him to wait outside your office and ask the servant to call you to the door.

I have more than once been startled on entering my office to see a man or woman whom I knew had been constantly for days and nights nursing a had case of diphtheria sitting complacently alongside of two or three children, all waiting to see me. On several occasions, mothers have brought children sufferiog from severe attacks of diphtheria to my office and waited to see me.

When you come home from a case of contagious disease, besides washing your hands, face and head with soap and water, hang up your hat and coat in the air, and put on a fresh coat.

I did this some time ago and forgot to bring them in when I went to bed. It rained hard all night; but better lose a hat and coat than a patient.

If you return late at night from a case of contagious disease, besides washing, undress before going into the room where your children are. Keep your own children out of your office, and do not take them in the carriage with you when visiting patients. How do you know but some of your calls may be upon those with contagious diseases?

Our Board of Health instructs us, in cases of contagious diseases, to forbid the children of the household to attend school or other places of publc resort. This is a wise precautioo, and the doctor, when he has been in contact with contagious disease, should, so far as possible, follow the advice given to the children.

We are told that familiarity with crime leads us to endure it. Likewise familiarity with contagious disease is likely to make us at times careless in using the means necessary to prevent its spread. Physicians are but mortals, and, while as a body they are conscientious in the discharge of their duties, candor compels me to confess that they are not at all times as careful as they should be.—Dr. John Graham, in Philadelphia Medical News.

Naphthalene and Benzol in Coal Gas.

In a paper by Professor Buote, read before the 31st meeting of the German Gas Association, on the above subject, he began with the statement that naphthalene is not formed in the gas while in the pipes, but in the retorts, and only at a high temperature. In the process of gas-making, the gas which first comes off is rich in marsh gas and poor in hydrogen, while toward the end hydrogen predominates. If henzol is overheated, there is a slight separation of carbon and hydrogen, and naphthalene is formed. This is a very stable substance, and it is produced whenever organic substances are decomposed by a very high temperature; and this accounts for its unavoidable presence in coal gas. If the temperature be still further raised, we have still more coalescence, and anthracene and chrysene are formed; while beyond these we have absolute charring as in the formation of graphite on the walls of the retort.

One ton of coal gives 3.408 cwts. of gas, or 10,595 cubic feet at a specific gravity of 0.44; aod this gas contains 2.800 pouods of crude benzol, of which 2.100 pounds are pure benzol and the rest toluol and its homologues, as well as some traces of naphthalene. The tar is about 1 cwt., and the liquor about 2.2 cwts., and these together cootain about 0.112 pound of benzol and 0.09 pound of toluol, along with 0.672 pound of naphthalene, 0.157 pound of pheool, and 0.045 pouud of anthracene. The benzol is, therefore, present to the extent of 96 per cent in the gas and 4 io the tar; toluene, 89 in the gas aod 11 in the tar; and naphthalene, traces in the gas and almost all in the tar.

It might have beeo thought that the gas was completely saturated with benzol after the condensation aod purification, and that its surplus had been deposited in the tar. But this is not so. The reason why there is any benzol at all in the tar is that the heavy oils have dissolved some out of the gas. So far from the gas heing saturated with benzol, it would carry 87 grains per cubic foot at 15° C., while there are only from 18 to 22 grains in it. The gas can be cooled even by ice without depositing any benzol.

With naphthalene, on the other hand, the position is eotirely differeot. There is very little naphthalene in gas, but the amount produced in the retort is far greater than that required to saturate the gas, which will only take up about 0.3 grain per foot, at 15° C.; and there is 10 times this quantity of naphthalene produced. The gas is, therefore, saturated with naphthalene, while with benzol it is not so; and if it be condensed to 15° and then sent on, and afterward cooled down beyond that temperature, it must deposit naphthalene.

Naphthalene presents this specially inconvenient peculiarity, that at all temperatures below its fusiog point (80° C.) its vapor condenses immediately into the solid form, and deposits in light plates, which stick to the bounding walls, and can only be removed by special means. The naphthalene will not, therefore, go away of its own accord; that is, it will not flow away as the other products do when they condense; but the crystals may go on accumulatiog if the exposure to cold continues. Prof. Bunte's conclusion is that with gas thoroughly purified and then sufficiently cooled at the works, there is no fear of naphthalene deposits in the pipes.

THE UNITED STATES STANDARD OF LINEAR MEASURE.—The actual standard of length of the United States, adopted by the Treasury Department and the Coast Survey, is the Troughton 82 inch scale, and the *standard yard* is measured between the 27th and 63d inches at the temperature of 59.6° F., although recourse is had to No. 11 and No. 57 whenever great precision is required. The United States standard yard is *identical* with the British imperial yard, notwithstanding statements to the contrary to he found in some text-hooks, works on metrology and kindred subjects.—Edwin P. Clark in the School of Mines Quarterly, New York.

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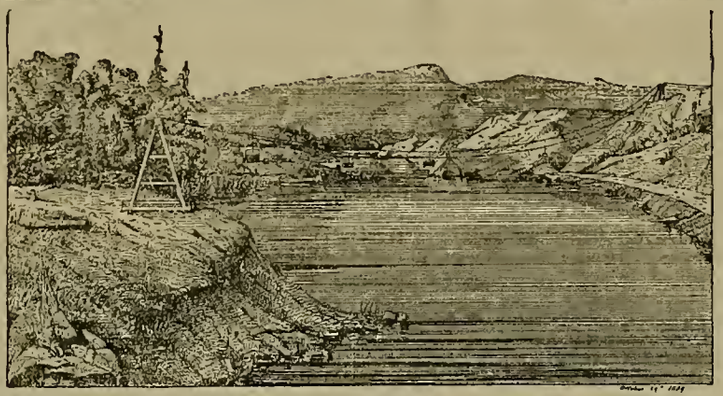

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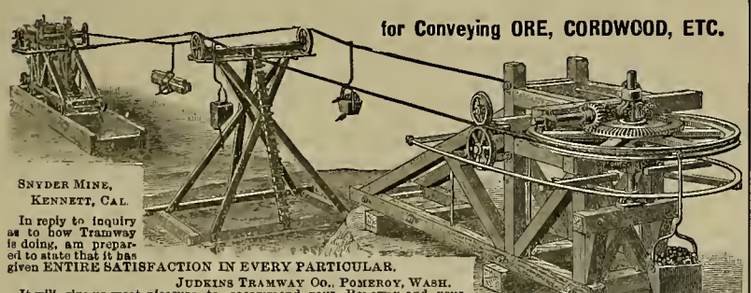

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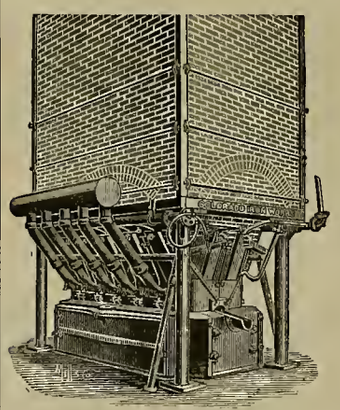

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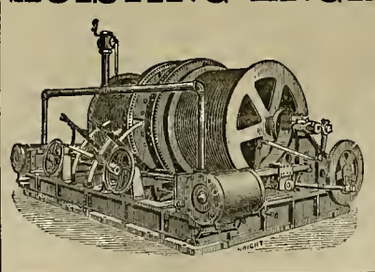

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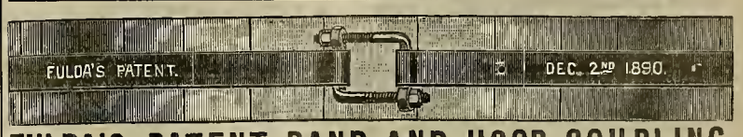

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Electricity.

Storage Battery Railroads.

So much has been said about the success of the Milford and Hopedale storage battery railway in Massachusetts that the official reports of Hartford citizens appointed to investigate the system will be read with great interest, says the *Western Electrician*. A local street-car company in the Connecticut capital proposes to ahandon horses and employ electricity as a motive power, and before the desired corporate permission was given a committee of citizens was appointed to carefully examine the practical working of the storage battery line at Milford, with the idea of securing the best possible system for the city before making the final decision. Prof. Robb of Trinity College was secured to accompany the committee in the capacity of an electrical expert.

The citizens have now made their reports, and it is not surprising that a considerable diversity of opinion exists. All the gentlemen were disinterested, and all entered upon the investigation with the hope that they could conscientiously report in favor of the storage battery as a practical, commercial factor in street railway work. Nevertheless, the only one of the party trained in the study of electrical problems felt compelled to report adversely on the system, the majority of the committee recommended the new system in guarded terms, but insisted that the Hartford company should also equip its line for the trolley system to be prepared for a failure of batteries, while only a mlnority of the committee declared unreservedly in favor of the employment of accumulators.

On the whole, the result of the investigation made for the benefit of Hartford must be regarded as unfavorable to the storage battery system despite the rose-colored reports of the achievements at Milford, which have from time to time been published in the daily press. The opinion of Prof. Robb will carry much weight, especially in view of the fact that the management of the Milford and Hopedale company denied him the the privilege of making a careful series of tests of the storage cell employed, for the purpose of determining its efficiency and durability. This refusal on the part of the company will certainly be taken as an admission of weakness by the general public. The professor also doubts whether it is practicable to carry enough energy on a car tn propel it, heavily loaded, up a stiff grade in rainy or winter weather — conditions which, of course, must be anticipated. He also wisely points out the present condition of the litigation over storage battery patents, and warns the public of the danger of interference on this score. Many of the members of the committee seem greatly taken by the smaller initial cost of the storage battery system by reason of the absence of poles and wires. Insufficient attention, however, appears to have been paid to the comparative charges for maintenance and renewals of the two systems, and the fact that the earning power of the trolley roads is greatly increased by the ability to attach trailers to the motor cars, which does not seem to be possible with storage battery propulsion, appears to have been entirely lost sight of. The figures presented in the report are far from convincing us that the storage battery system is the most economical of the two, when relative earnlng power is taken into consideration.

Everybody would hail the introduction of a practical, every-day, rough-and-ready storage battery system for the propulsion of street cars, with joy. How delightful to spin along in rapid-going cars actnated by a hidden source of energy, self-contained, with no smoke or cinders, laboring animals or landscape-disfiguring poles and wires! Rapid transit would then become ideal, and the New York newspaper men would be forced to abandon their "deadly trolley" cry and seek some other hugaboo to alarm the public. It is a pleasing prospect, but we fear that we have advanced but little toward it as the result of the first disinterested public investigation of the line at Milford.

LIGHTING CARS.—At the conclusion of a number of preliminary experiments, the Northern Railway of France has decided to make further experiments on a larger scale in the matter of lighting railway carriages by electricity on the Paris Lille line. Each car is lighted by means of lncandescent lamps of six, eight or ten candle power, run from a secondary battery; but, as a reserve ln case of break-down, the carriages can at need be lighted by oil without interfering with the electric plant. Each battery of accumulators has 16 elements inclosed in pairs in portable receptacles, which are placed in a wooden box suspended from the frames of the carriages and are easily accessible from the footboards. Each cell of the accumulators consists of an ebonite vase, and contains four negative and five positive plates, which measure eight by four inches hy one-fourth inch thick. The weight of the cell is about 28½ pounds, and the total weight of each battery is about 530 pounds, to which should he added that of the wooden case on the carriage into which it fits. The cells have each a capacity of 114 ampere hours when fully charged. The lamps work at a potential of 30 volts, and are fixed with thelr reflectors on the roofs of the carriages. —Chicago Journal of Commerce.

Testing Coal by Electricity.

It is not, perhaps, too great a flight of imagination to assign this title to a method which W. Hempel has recently devised for use in determining the character of coal. Sulphur is a troublesome constituent which the gas companies would rather have absent from than present in the coals; moreover, it seriously impairs the quality of the gas produced. The "monopolists" recognize *now* that they must strain every point in order to produce good gas; this has been forced upon them by competition, hence in this respect, too, electricity has done the public good service. W. Hempel is one of the leading authorities on coal-gas in Germany, and he has recently adopted a method, first devised in more complex form by Berthelot, whereby the sulphur in coals may be estimated, and hence their suitability for gas-making determined before purchase. In doing this he has taken advantage of the cosmnpolitan aid which electricity offers. The coal to be tested is powdered and pressed into a little platinum wire cylinder, to which a long platlnum wire ls attached, and then burned. The combustlon is effected in an ordinary glass bottle, which is fitted with a trebly perforated India-rubber stopper. Through this passes a tube with a glass stopcock, and which widens out into a cylinder; also two glass tubes, to the lower ends of which are fused two long thick platinum wires. One of these wires carries the little platinum cylinder or basket already referred to. A little mercury is poured into the tube so as to establish sure contact with wires which lead the electricity. When the current is passed the platinum basket becomes white hot, the combustion of the coal is effected, and the gaseous products con taining the sulphur compounds are led off through the stopcock and examined chemically. This method is exceedingly neat and gives, it is said, very satisfactory results, which enable the character of the coal to be accurately determined.—London Electrical Review.

Cable and Electric Traction.

The relative advantages of cable and electric traction under different conditions is strikingly illustrated in the lines of the California Street Cable Railway Company and those of the San Francisco and San Mateo Railway Company. In one case we find 11 miles of track on which an average of 45 cars a day are run by cable, at a cost of little more than $1 per car for fuel, while in the other case by electric power the fuel costs $3.20 a day per car for 25 cars on 20 miles of track. In both cases triple compound condensing engines are employed, the average daily horse power for operating the cahle line being 350, that for the electric 800. And yet the conditions are such that it would cost more to operate the electric line by cable than it does by electricity, and the cable line could not possihly be operated at all by electric power. The cable system embraces two lines which cross each other midway from their terminals, at which point the power-house is located, so that It requires only four ropes to operate the lines, neither of which is excessively long, while the grades are very numerous, and range from 14 to 21 per cent. The electric line is 14 miles in one general direction, so that were lt to be operated by cable it would require two power-houses, and the alignment is such that the curves would consume a large amount of power; it would require a double track all the way, and with a headway of only 20 minutes as now on the suburban end, would make the cost per car by cable traction exceedingly high.—Street R. R. Journal.

PULLING UP ROOTS.—One of the most useful agricultural appllances that has been devlsed for the clearing of new land is the root puller, and many years of labor have been saved in this country by its adoption. The record for both efficiency and economy is likely to be broken by a root grubber worked by electricity, which has just been brought out in England. On account of the advantages to be gained from the water power, a manufacturer has established his works on the hanks of the river Darenth, in Kent. When first acquired, the works consisted of a ruinous and delapidated old flour mlll, hut it took only a short time to make them remunerative. The water gives the power for a generating plant, as well as many other machines connected with the factory, which is lit by electric light. A second generator is used for experiments in electrical plowing, threshing, etc. The owner of the factory is an enthusiast in these matters, and thinks electrical agriculture has a great future before it. A third dynamo is used for generating current for supplying the gruhbing apparatus at the top of a hill two miles distant. The current is taken by overhead wires on telegraph poles to the motor on the grubber carriage. At the top of the hill several acres have been already gruhbed. The ground is being cleared for the purpose of constructing one of a series of large forts for the protection of London.

Useful Information.

What Is a Horse Power?

One-horse power is the power needed to raise 33,000 pounds one foot in a minute. This is a plain statement, and the inference to be drawn from this statement, that to raise a larger weight in the same time or to a greater distance will require a proportionately larger amount of power, is also plain to any comprehension; and yet no term used commonly in mechanics conveys so indefinite information as the term "horse power." Why? Because cause and effect are mixed up. A 10-horse power engine may be used with an effect of but one-horse power, while the same engine may be worked up to double lts rating.

How much power am I using in running a certain machine, and how can I estimate it? Circumstances will alter cases. You can estimate it from the coal you are burning under your boilers; you can measure the amount of water you are using to turn your water-wheel, or in the case of simple work like pumping, you can figure out the amount of work done, *i. e.*, the actual number of pounds you have elevated a given number of feet, but the three methods, as well as a number of others which will occur to the mechanic, will differ in results.

In considering such a problem, first make up your mind what it is you wish to know, *i. e*, do you wish to know how much power you are using to do certain work, or do you want to know how much result you have got? Thus if 33,000 pounds raised one foot high is the equivalent of one-horse power, how many horse powers have I used in raising my tank full of water, which is, say, 30 feet above its source and which holds 330,000 pounds of water?

Disregarding friction of the waterflow through the pipes, you have got the result of one-horse power continued for 300 minutes. Now, if you wish to fill this tank once in 24 hours, and can surely run your pumps for ten hours, you will need but a one-horse power engine to do the work, as you have to ohtain but a theoretical result of five hours' work. Still no account was made of friction, and it did exist. If it did not exist, it would be true that a water-wheel attached to the tank would yield a horse-power for the given time, five hours; and this same wheel would actuate the pump and return all the water to the tank again. It ls probable that a well-arranged water-wheel and pump would return over one-half; but a one-horse power engine which could be operated 10 hours each day, if necessary, would be none too large.

In most cases the horse power used could not be so easily or accurately estimated as in this one. Take the case of a large mill with a multiplicity of machines, to which it is proposed to add one. How much power will it call for? In this case one must estimate from the belt which the maker of the machine says is necessary. Now we find that the different authorities give different rules and the result will vary widely according as we use one or another. It does not seem as though they should, but a little consideration will make plain the wherefore. The circumference of the ordinary saws in our sawmills ordinarily run about a mile a minute. No one would expect, if the speed should be reduced one-half, to be able to do one-half as much, and, as a matter of fact, it would require much more than half the power to cut one-half the hoards. It ls easy to account for this by saying that the momentum of the high speed helps, but as this momentum is gotten from the source of power, it is not too clear where anything is gained or lost. Still the obvious fact remains, and thus accounts for the varying results gained by figuring by one authority or another. They made their rules by the observing of widely varying circumstances.

If I was a mill manager and was interested in the subject, I would take some standard authority, and after figuring all my machinery by his rule, add the results and then compare with figures obtained from my source of power. Thus I might find that my woolen mill, according to my standard, was nominally using 100 horse power, while figuring from the amount of water I was using on my water-wheel I was really using 120-horse power. With such a result as this it would be advisable to call in a water-wheel expert and see if my wheel was giving as good results as I ought to get. If the wheel was all right, add 20 per cent to all results galned by using the adopted standard, and justify yourself by assuming that probably the expert whose rules you are using made his rules from data gained from observing a differing class of machinery, which ran at a higher or lower speed.

It would be well, lf possible, to follow the rule of some expert who made his rule from data gained from observing the same kind of machinery you are using, but in default of this the way suggested will give very accurate results. For a rule which is the average of many experts, Haswell gives the following: Multiply the width of the driving belt in inches by the number of feet it runs per minute and divide by 1000, the answer being the horse power.—Fiber and Fabric.

The Care of the Hair.

The best hair-dressers tell us that it is quite an easy matter to wash the hair too often and thereby destroy the vital oils essential to its growth. The use of bay rum or any stimulants, or of borax or alkalis of any kind, is condemned by some of the authorities. One of the best things for washing the hair is the white of an egg, which is especially nourishing on account of the albumen which it contains. It should be rubbed thoroughly through every part of the hair and rinsed out with tepid water. It will require repeated rinsing before the water runs clear, but not until then is the process thoroughly accomplished.

When applying the white of the egg, ruh it on with the tips of the fingers, touching every part of the scalp, and continue this vigorous manipulation of the scalp for several minutes. Where any soap is used, the best quality of white castile is alone allowable. Some hair is so naturally dry and free from oil that a little pure vaseline should be applied after it is washed and dried. Other hair possesses enough natnral oil in itself and does not require any such addition. Where the hair has become dead, or does not grow vigorously, a preparation of rum and quinine or some of the various tonics of quinine sold by trustworthy hair-dressers will be found valuable.

There is an excellent one which has in it a portion of oil of neroli or the essential oil of bitter oranges as a component part. This gives a refreshing fragrance and is possessed of valuable tonic qualities. The hair should be clipped monthly. This assists the growth materially and stimulates it.—New York Tribune.

Care of Boilers When Not in Use.

For the preservation of boilers when not in use an order has been issued to the French Navy, which is thus abstracted in the "Journal of the American Society of Naval Engineers:"

On hoard all ships ln the reserve, as well as on those which are laid up, the boilers will be completely filled with fresh water, and this is to apply to shell boilers as well as to those of the tubulous or pipe type. In the case of large boilers with large tubes there will be added to the water a certain amount of milk of lime, following the instructions furnished by Bellville & Co., for the preservation of the tubes of their hoilers, or a solution of soda may be used instead. In the case of tubulous boilers with small tubes, milk of lime or soda will be added, but the solution will not be so strong as in the case of the larger tuhes, so as to avoid any danger of contracting the effective area by deposit from the solution; the strength of the solution will he just sufficient to neutralize any acidity of the water.

Care must also be taken to preserve the outside of the steel or iron tubes in the case of boilers which are not to be used for long periods. To this end they will be painted with red lead or coal tar as far as it is possible to reach. For those places which are inaccessible, a protective coating will be obtained by burning under the tubes a certain amount of tar or coal tar, whose smoke

will form a coating of soot and thus prevent the air from reaching the surface of the tubes. In addition, the boiler casing will be closed and kept air-tight after placing inside some quicklime. Periodical inspections of boilers thus treated will be made, to assure the complete filling of the tubes with water. Power.

THE influence of the moon on the barometer is dealt with by Mr. Bornstein in a recent article in the *Meteorologische Zeitschrift*. He refers to the question as to whether there exists any relation between the pressure of the atmosphere and the altitude of the moon. This study is hased upon observations made at four different stations in Germany and Austria, and does not take into account the phases of the moon orher distance from the earth, but in 1859. Gold has been to the settlement of the Pacific coast and to the opening of the Rocky mountains what the illusions of life are to us all. They lead us to different bnt greater things. The real wealth of California and of Colorado is in the harvest of their fields, but it required the glittering attractions of gold and silver to bring in the populations which were 10 find independence and wealth in prosaic hushaodry.—Watchman, Boston.

THE NEW AUTOMATIC GAS METERS were exhibited to the shareholders at the annual meeting of the Ipswich, England, Gas Company. These meters will be gratuitously supplied to any house as soon as a sufficient number can be obtained, and, by dropping a penny in the slot, the customer obtains 25 feet of gas, or enough to supply a good light for five hours. In the course of the meeting, the vice-chairman said that nearly 5,000 of these meters are now fixed in Liverpool, and he helieved they would have the effect of inducing artisans and small householders generally to adopt gas as an economical substitute for any other light or heating power yet introduced. Several artisans in Ipswich had had the meters fixed in their houses, and two of them had told him that the gas supplied in this way was cheaper than oil.

THE amount of sleep needed hy cbildren is in inverse proportion to their ages, and in direct proportion to their mental and muscular activity. Thus, the younger the scholar is, and the more actively he exercises mind and body, the more sleep he requires. During the whole period of growth the child needs a longer nigbt's sleep than does the adult. Many parents seem to he entirely unmindful of this fact, and the requirements of some schools which necessitate or encourage more home study equally disregard one of the prime requirements for tbe present and future welfare of the cbild. The bloodlessness, weakness and bysterical excitability that characterizes the young lady of modern life, who is neither well nor ill, are due mainly to her bad habit of takiog too limited a supply of sleep at irregular hours.

A PROMISING INVENTION in telephone circles is the "nickel-in-the-slot" telephone, one of which has been placed in Willis' hotel, at Wilmington, Del. All you are compelled to do is to drop in your nickel, dime, or whatever it may he, and the telephone does the rest. Slots are made for a nickel, dime, a quarter, half-dollar and a dollar. When either of the above denominations is dropped in the slot, the telephone rings at the exchange, and then the operator knows how much money has been dropped in the slot and how long and to what point the person is entitled to talk. The invention is gradually finding a field of usefulness.

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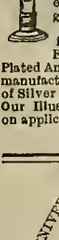

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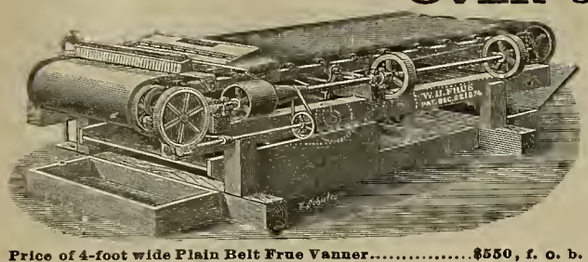

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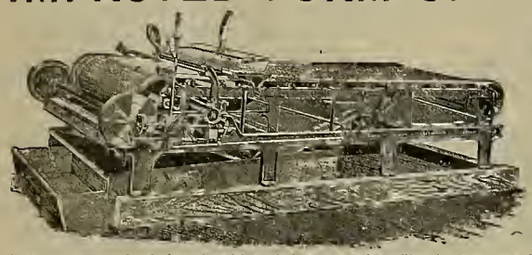

The annexed cut illustrates the "**TRIUMPH" CONCENTRATORS,** and shows the recent improvements which have been introduced into their construction, by which many advantages are gained over any other form of Vanners, Vanning Machines or Concentrators.

These advantages are obtained by reason of the fact, as will be observed, that the crank-shaft is now placed and fitted at the head of the Concentrator, clear of the belt and in direct view of the operator or attendant. This, of course, greatly facilitates the oiling of the bearings of the shaft and connecting rod and precludes the possibility of any sand or detritus, passing over the belt, from reaching or getting into the bearings.

The forms of the bearings and as well of the connecting-rod brasses have also been very much improved, making them stronger, simpler and more easy of adjustment. Important changes have also been made in the feed screw and quadrant for regulating the belt, with the view of making all parts of the machine stronger, more accessible and as easy of regulation as is possible.

We furnish the "TRIUMPH" Concentrators with either the plain or "Blasdel" Riffled Belt and shall be pleased to quote prices with the adaptation of either, as may be requested, and shall further be pleased to show one of the improved form, set up ready for operation, at our office.

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Joshua Hendy Machine Works, No. 51 Fremont St., San Francisco, Cal.—Gentlemen:—Following the testimonial letter which I addressed to you December 9th, 1890, in relation to the superiority of the "Triumph" Concentrators over either the "Frue" Vanners or "Woodbury" Concentrators for concentrating our Texas ores, I hold now to the opinion then expressed; and with nearly two years and a half further experience in their operation I can confidently assert and am more fully convinced than then, that the "Triumph" Concentrators are better in all respects than any other form for concentrating our Texas and Bully Choop ores, and in evidence of such confidence I refer with pleasure to the order recently placed with you for four (4) of the "IMPROVED TRIUMPHS," to make up the complement required for use in the new twenty (20) stamp mill at the "Cleveland Consolidated Mining Co.'s mines in Bully Choop Mining District in Shasta and Trinity Counties, this State, and I feel assured that the improvements lately introduced into their construction will make them even better than the old form which I have had in operation for so many years past in the different mills under my supervision. I am, very truly,

(Signed) R. G. HART, Sr., Manager Texas and Cleveland Cons. Mining Co's.

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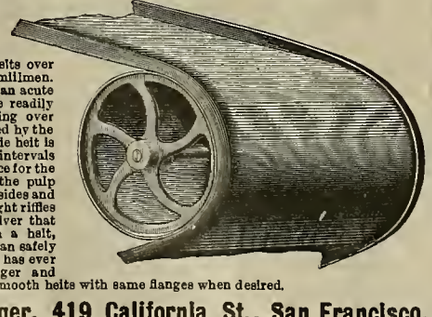

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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned

CALIFORNIA.

Amador.

SOUTH EUREKA —*Ledger*, July 14: The South Eureka mine, located on property which was partly on the Vandament and partly on the Tanner ranches near Sutter Creek, is one among the few which is being prospected on a sensible and business-like plan. The property was opened up about two years ago, Jackson Dennis of Sutter Creek, Dr. J. Mayon of Oakland, and J. F. Parks of the Kennedy being the chief owners, though at the present time the stock of the company is held by a number of other people. J. L. Mayon is president, J. F. Park superintendent and Andrew Riley foreman. The company supplied itself with the necessary machinery from the defunct Hex mine in Calaveras county at a reasonable figure, putting in a hoisting plant capable of sinking 1000 feet. Their power is transmitted by wire cables from the water-wheels near the road to the top of the hill where the hoist stands, giving them abundant power. The shaft was carried down 500 feet, when crosscuts were run and the ledge struck, showing a very fair percentage of gold. It was then decided to go to the 800-foot level and tap the vein from that point. A short time ago they reached this point, and then concluded to carry the shaft down 200 feet more before crosscutting into the ledge matter, and they are now engaged with this work. The South Eureka are working in the proper manner. They propose to find their mine and do their prospecting before taking out rock and putting up a mill and other expensive machinery. It is a great detriment to the mining industry of the mother lode that so many companies have erected expensive mills and other works before a mine was found.

AMADOR GOLD MINE.—On July 10th a suit was begun in the Superior Court by the Amador Gold Mine, a corporation existing under the laws of the State of California, against the Amador Gold Mine, Limited, a corporation existing under the laws of Great Britain. This action is brought by the American people against the English contingent to secure undisputed possession of the property of the Amador gold mine located near Jackson. The American people sold the property to the English company, placing the deed in escrow, there to remain till the money was paid, but through the machinations of those who manipulated the sale the deed was delivered and no money paid. The American company, of which Martin Jones is president, feeling that there are equities in the case, has instituted this action to secure their rights in the matter. Lindley and Eickoff are the attorneys for the plaintiff in the action.

IN FINANCIAL TROUBLE.—The Clinton Consolidated Mining Co. is again in trouble. This time the firm of B. & M. Isaacs has placed an attachment upon their store for something in the neighborhood of $1000 for goods delivered, and S. W. Bright has placed an attachment on the mine for meats furnished in the sum of $194, and J. J. Thomas of Amador, who formerly conducted a butchery business here, has put an attachment on for nearly $300 owed to him also for meats. A San Francisco firm has also attached for something like $1500. The mine has struck a financial squall very often during its career, but has always managed to pay up and continue work. What the result of the present complications will be it is impossible to predict.

ANDAYE BIG.—C. L. Newton, of Woodbridge, one of the owners in the Mason mine of Jackson recently had some rock from that property assayed. The returns showed that the quartz per ton contained $22.15 in free gold and the sulphurets went about $75.

NOTES.—Chas. Mitchell is arranging for the formation of a company to develop his Calaveras mining property. The Littlefield tunnel on the Albany property is being pushed forward, stringers of quartz being daily encountered. Dr. Bardoe, owner of the Amador Queen, No. 2, is on the ground and has men cleaning out the works preparatory to working the mine. Recently the Kennedy people put in two additional concentrators, and they are so well pleased with their work that they are now grading for four more back of the mill. The Argonaut Mining Company has purchased the Pioneer mine, and the work of preparation for its development is going on as rapidly as the circumstances will permit. The Farrell tunnel is being pushed forward as rapidly as three shifts of men can do the work. It is rumored that the Farrell people contemplate erecting a five-stamp mill soon. The case of Mattley vs. Boxall has been settled out of court, and J. B. Francis, who now holds a bond on the property, has assurances from friends that a company will be organized in a short time to thoroughly prospect the property for quartz.

A GREAT MINE.—*Record*, July 15: During the past seven months the Kennedy gold quartz mine, which is located a trifle over two miles from Sutter Creek, has paid in dividends $350,000—or an average of $50,000 a month. If any of our sister mining counties in California can beat this we would be pleased to hear from them. Amador county has for many years past been famed for its bullion producers, and the record being made by the Kennedy shows that the list is not exhausted. Indeed, it is safe to say enough gold lies undisturbed in the hills of "Little Amador" to-day to brush away the present feeling of distrust in monetary matters that spreads like a pall over the entire country, were it only possible to put it in circulation.

Butte.

GOLD MINING.—Cor. *Call*, July 13: The mining interests in Butte were never more bright and promising than at present. The demand for gold has stimulated all classes of miners to renewed efforts in discovering mines and in pushing developments in those already being worked. A new mill was lately completed at Nimshew for working quartz, and the first two runs have been very successful. Colman & Paxton at Yankee Hill will erect a new quartz mill during the present season, and the rock is said to be exceedingly rich. Col. Frank McLaughlin and a New York company are sinking on the famous Banner mine near Oroville, which at one time was one of the richest ledges in California, and which is believed to contain a large quantity of rich quartz below where work ceased. D. K. Perkins will erect a new quartz mill at the Golden Summit mine, which has an altitude of 6300 feet, and is the highest point in Butte where any mining is done, if not the very highest altitude in the county. At Merrimac Mills the Palo Alto Company is engaged in setting up a large new engine and boiler for running the 20-stamp mill and will put in ten additional stamps as soon as they can be placed in position. The Phœnix quartz mill at Hurleton began running this week after a short close-down on account of lack of water. The company is making fine developments and sinking to a great depth. The lode proves wider and richer as it is descended upon. The Pactolian Company, near the same place, has 12 men at work, but recently found such a large body of rich quartz that the owners will now hasten developments by putting on 40 men. H. P. Stow of the Gold Bank mine at Forbestown owns a mine near Hurleton, and is pushing work upon it to open the mine and develop it before any mill will be erected. A French woman in the same vicinity has discovered a good lode and has with her own hands run a tunnel some 30 feet in depth to open the lode. The rock is rich but the vein not wide. At Wyman's Ravine Wheeler & Sons are sinking upon a gravel mine which they think will prove valuable. Near them Snyder Bros. are also opening a mine. At Wyandotte A. S. Parsons is working a vein of quartz and the rock is looking well. At Bangor there are five gravel mines being operated. The gravel is a hard blue cement and has to be crushed in arrastres before it can be separated from the gold. These arrastres are run by steam power, and two of the mines, that of the Catskill Company and the one known as the Blue and Gold, have taken out many thousands of dollars during the past six months. Some half-dozen other companies are making developments in the vicinity. The recent discovery of a rich pocket of quartz, from which over $1200 was taken in a few days, has led to quite an excitement in this line of mining, as several parties are searching for quartz lodes in the vicinity, while some old ones that were at one time abandoned are now being examined with a view of working them. At Forbestown the most extensive and costly quartz developments are being made. The mines there were worked at one time and then abandoned, as the rock contained sulphurets to such an extent that it could not be profitably worked under the processes then in use.

A few years ago these mines were reopened, and extensive developments have been made during the past two years by W. W. Stow and Alvinza Hayward. The former has a 40-stamp mill, which is considered one of the finest on the coast. The most modern scientific appliances are used for saving the sulphurets, and the rock is paying well. The mine has been so extensively opened that it is claimed there is ore enough in sight to last for ten years. A large force of men is employed, and the rock is paying so well that it is said the mill will again be enlarged, though 20 additional stamps were put in this season. The mill and mine are lighted by electricity, and the machinery is run by water power. H. P. Stow is the manager, and has shown remarkable capacity in bringing the mine into the high state it now occupies. Mr. Hayward has erected a splendid mill and the largest reduction works in the northern part of the State. These works are now ready to begin operations. The lode has been sunk upon to a depth of 500 feet, and the rock constantly increases in richness. The famous Sierra Buttes Company that owns the Plumas Eureka mine in Plumas county, the Sierra Buttes mine in Sierra and the Uncle Sam mine in Shasta has bonded the Reasoner mine at Forbestown and set 12 men at work developing the lode. If the rock proves satisfactory when the ledge is opened to a depth of 500 feet, the mine will be purchased and a large mill erected. The Williams mine is another valuable property near Forbestown, but no ore is as yet being crushed. The Carlisle lode is one of the largest and finest in the State, but it has been in litigation for some years and a suit is now in progress to quiet the title. Forbestown is making rapid development, and 25 new buildings have been erected during the past two weeks.

Inyo.

SOUTHERN INYO. — *Register*, July 13: Jake Faleetine came up Tuesday from southern Inyo and reports nearly all work suspended in the line of silver mining in that section. The Modock and Minnietta mines are closed, except that one or two men are working on lease. Some prospecting for gold is being done in Mountain Spring canyon, about 30 miles south of Darwin, but little else is being done. A few men are still at work in the Defiance at Darwin. The Newtown Company at Cerro Gordo has discharged its force, and Boland has also paid off.

Mono.

MOONDAY.—Bodie *Miner*, July 14: Messrs. Cameron, Kelly and Graham have made a run of about 60 tons of Moonday ore at the Bodie mill, and when the clean-up is made they will no doubt find themselves much better off financially. We learn that no sale of the Ward mine has yet been made. Mr. Ward resumed work at the mine yesterday, and will at once make preparations to mill a quantity of ore which he has on hand.

THE STANDARD MILL.—Bodie *Miner*, July 15: The familiar toot of the Standard mill whistle is no longer heard, and many a miner will miss its sound in the morning and will have to rely upon other means of waking up in time for work. The mill is now run by electricity, and everything is working smoothly and satisfactorily. By the substitution of electricity for steam as motive-power, it is thought the company will make a saving of about $18,000 a year in fuel and lights.

Nevada.

LIVE OAK.—Placer *Republican*, July 12: The Live Oak Consolidated quartz mine, situated near Wolf, about midway between Auburn and Grass Valley, and in which a number of citizens of Placer and Sacramento counties are interested, is giving promise of becoming an excellent property. The ore body is large and runs $32 to the ton in milling tests. An eight-stamp mill has just been erected on the property, and will be started up in a short time. The ledge has been thoroughly prospected and the owners believe that a bonanza is in store for them. Such level-headed Sacramento men as A. Meister, J. Goethe, Thos. Rndech, John Miller and J. A. Moffett are interested in the mine.

GOING TO MEADOW LAKE.—Nevada *Transcript*, July 12: Mr. Maxwell, who arrived here a short time ago to look at our mines, will go to Meadow Lake soon to examine the famous Excelsior mine, which property belongs to Mrs. H. H. Hartley. If satisfied with the prospects, he will arrange to work the mine. The Excelsior is regarded as the richest mine in the district. In years past "Old Man" Hartley took out considerable gold from this ledge. It is claimed that the rebellious ore can be successfully worked by some of the present processes, thus overcoming the difficulty that has hitherto been encountered in the treatment of Meadow Lake ores. Mr. Maxwell will investigate.

THE EAGLE BIRD.—The Eagle Bird mine at Washington is said to be looking better than it has for a long time. On the 600 level the ledge is 14 feet wide and the rock that comes from it pays well. The ledge on the 400 level is looking better, and the outlook at the mine is very bright. We understand a syndicate has been formed for the purpose of buying and working some of the undeveloped mines in Washington district and that they will soon be ready to begin operations. The prospects are good for prosperous times in that section in the near future.

THE MAYFLOWER MINE.—*Transcript*, July 14: For the past 10 or 12 years the owners of the Mayflower quartz mine, which is situated on Canada Hill, have been steadily opening up and developing their property. At different times there has been remarkably rich rock taken from the mine, but the extra rich quartz seemed to be in spots. The ledge would vary in size and the quartz in richness, and although at times the outlook was very blue, yet the plucky owners kept the work going steadily on. They had many obstacles to contend with, but they felt satisfied that there was a good mine there and kept digging away, sometimes finding bright spots that paid them well and cheered them to keep on. Lately the prospects at the Mayflower are better than they have ever been. Very rich rock is being taken out and the indications are that the mine will soon be one of the regular dividend-payers of this district.

Shasta.

A GOLD STRIKE.—Dispatch to *Examiner*, July 11: A discovery which promises to be the richest strike ever made in northern California was made about 30 miles from Sisson, on the north side of Eddy mountain, by William Dale of this city. It transpires that about four years ago some very rich float was found in the neighborhood of the present find, which proved to be very rich in gold, some samples of which assayed as high as $600 to the ton. H. B. Maxwell, a partner of Dale, forwarded some of the ore to an assayer in Oregon, and soon afterward they both left the neighborhood, not knowing how valuable a discovery they had made. The assayer immediately recognized the importance of the find and came on to Sisson to find Dale and Maxwell, with whom he went in partnership for the purpose of prospecting for the main ledge, which was recently found. Matters have been kept quiet and an eight-foot shaft has been sunk, which has laid bare one of the richest strikes of gold-bearing quartz ever found in the State. The ledge has widened from a foot to two feet and a half, and at one place eight inches is 80 per cent pure gold and which has to be cut out with a chisel. The lode can be traced for a mile in a southerly direction and lies in the center of the gold belt. A large delegation of citizens from Sisson and Igernia left Saturday for the scene of the new strike. The hills are full of prospectors and every inch of ground in the neighborhood is located. The owners were poor men, but have extracted in the neighborhood of $10,000 in gold from the quartz taken out. A dispatch dated July 19th, relating to this same strike, is as follows: The recent gold discovery promises to be one of the richest struck in this section of the country and has caused great excitement. It seems that the discovery was made accidentally about five years ago by Harvey Maxwell while riding through the hills. Some of the ore was sent to an assayer in Portland, after which the mine lay idle for one year. The assayer evidently understood the value of the find, for he sent a man down to hunt it up. The agent was unable to discover it, and he then searched for Maxwell, but could get no trace of him. Failing in these efforts, he informed Dale of what he was hunting for. Dale kept the matter quiet, but began searching for the lost mine and discovered the lead last winter after considerable prospecting, during which he traced the float for a distance of two miles. This summer a shaft was sunk over the ledge, which is widening out gradually with a pitch of about 30 degrees. The ore is very rich, consisting of sulphurets and free gold. The latest assay gives returns of $620 to the ton. There is a quantity of ore out now, but it has not been worked yet. It is the intention of the owners to put up a mill as soon as possible. Those interested in the mine are Dale, P. Keirnan and Keirnan's two sons, and they do not desire to take any others. Dale is locating several parties on claims in the vicinity and the extensions. Prospectors are coming in from every direction. Several placer claims which have been unworked for years are developing rich. The mines are located on the north side of Mount Eddy, 15 miles from Sisson and about two miles from Walbridge's mill.

Sierra.

SIERRA CITY.—*Mt. Messenger*, July 15: Mining interests are on the improve hereabouts, and prospects are rather bright for a prosperous future for this noted mining camp. Ten men are working at the Mountain quartz ledge, where considerable gold is being extracted. Geo. Pinney, one of the leading interested parties in this mining property, is expected to return here the coming summer. Fourteen men are employed by the Sierra Buttes Quartz Mining Co. Ten stamps are crushing ore at No. 7 mill. A number of men are busy at the Colombo quartz mine and mill. Eight men are working at the Chips quartz mine. Jos. Perry and Wm. Jenkins are hauling quartz from the Independence ledge down to Sierra Buttes No. 9 mill, where 20 stamps are crushing ore. A contract to run 600 feet of tunnel to tap the channel ahead of the present workings, will soon be let by the Gibraltar Mining Co., whose main tunnel is in 900 feet. The capital stock will be increased from 2600 to 30,000 shares. F. Trimpin is acting as secretary in place of Geo. B. Albee, now in San Francisco. At the annual meeting, held in Sierra City, the following-named officers were elected by acclamation for the ensuing year: M. E. Loeffler, president; E. Schoch, treasurer; F. Trimpin, secretary; John Sorracco, Adam Kieffer, E. Schoch, M. E. Loeffler and F. Trimpin, directors. Prospects are very flattering for a good-paying drift mine. About $30,000 has been expended thus far in developments. Jos. Carney returned Tuesday from the county seat. He is mining near Gold Lake, and his claims yield well.

Tuolumne.

ENCOURAGING. — Union *Democrat*, July 15: The Garfield Virginia mine still looks encouraging; the main tunnel is now over 100 feet in length on the course of the vein, and it is estimated that 75 feet more must be run before tapping the pay shoot, which, when properly opened, will prove to be a first-class milling proposition. This mine is situated on the banks of the main Tuolumne river, and an abundance of water for power can be obtained the year round at a small expense.

NEVADA.

Washoe District.

A REDUCTION OF EXPENSES. — *Daily Report*, July 19: As the *Report* has several times informed its readers in its stock articles, a general reduction in the cost of mining on the Comstock lode is soon to be brought about. There will be a very material scaling down in the salaries of all officials, from the highest to the lowest, and also in the cost of transportation, supplies of all kinds, the milling of ores, and, lastly, the wages of the miners. Those who are in charge of the movement say that unless the reductions contemplated are made the Comstock mines must soon close, for with silver quoted at such a heavy discount, and with most of the mines unproductive and searching for new bodies of ore, it will be impossible to collect assessments upon stocks which have receded in the average to prices which equal the amount of the assessments asked for, and in some cases exceed it. There are in the Comstock lode millions of tons of low-grade ores, which at reduced expenses can be made available, and can be worked at a profit. Much of this low-grade ore assays high in gold, so that the heavy discount in silver does not much affect it, provided that expenses can be reduced to a point where it can be profitably mined. Such ores abound in vast quantities in the Consolidated California and Virginia, Savage, Hale & Norcross, Chollar, Potosi, Yellow Jacket, Consolidated Imperial, Crown Point, Belcher, Overman and Justice mines, and are to be had in lesser amounts in many of the other mines. The reduction in general expenses now contemplated will amount in the aggregate to between $50,000 and $75,000 per month along the Comstock. Even with silver below its present quoted value the leading productive mines cannot only live, but be made to yield a profit with expenses so reduced. This, as already stated, is largely owing to the high percentage of gold in Comstock ores, amounting in some cases to 75 per cent. The agreement which the salaried officials of the Comstock in this city have signed will be sent to Virginia City tonight. The other reductions are expected to follow. Some of them have already been arranged. Regarding the Miners' Union, a well-known Comstock superintendent, who arrived here yesterday, said to a *D. R.* reporter this morning: "The boys have talked this matter over for a long time and thoroughly understand it. I believe the union, realizing the situation and seeing how all the other interests are giving way, will voluntarily submit to a reduction in miners' wages, which are now $4 per day, the same as they were in the palmiest days of the Comstock. There are now only

325 miners at work on the Comstock, and those who have left it find it hard to get employment at $2 and $2.50 per day. In the whole State of Nevada only 650 miners are now emuloyed and only 500 of those are drawing pay. If expenses are reduced. 1000 men will be put to work in the Comstock mines at $3 per day each, thns making good profits for several of the companies and iucreasing the chancee for striking new bodies of ore.

Osceola District.

GAAVEL MINING.—Sslt Lake *Journal*, July 10: The Osceola Gravel Mining Co. is working a large force of men in the mine, and also on its finnes, ditches and reservoirs. Next year it will be able to utilize its water twice by picking up the water after it has run through the mouitors and ruuning it into a reservoir and then conveying it by fiume and pipe monitore that will be put in place this year one mile below. Qnartz mining in this camp is coming to the front. The more development that is done, the more the mines improve aud show more of the yellow metal. A. J. Millick is working a force of men on the Cnmberland and Stamhoul mines. Mr. Johnson is working the Gold Quartz mine, owned by the Calnmet Co., and it is showiug up fine. Boou Tilford is workiug a force of men on his dry wash mine. Messrs. Hi" & Hndson made qnite an important silver and lead strike a few days ago, the assays ruuing 115 ounces in eilver. They have struck ore since that will go at least 60 per cent lead, and I thiuk much higher in silver than the dry ore. This find is in lime and close to the qnartzite contact, and is one of the best formations known for silver and lead ores.

Reese River District.

GLOOMY OUTLOOK.—Reese River *Reveille*, July 15: The situation in Austin and surrounding country is anything but favorable. When the bottom dropped out of silver a few days ago the Austin Mining Company closed down, and that put probably 200 men, directly and indirectly, out of employment. Since that time the streets have shown a gloomy state of affaire. On Saturday General Manager Farusworth arrived in town from Utah. When he left Utah he had resolved to resume operations on his arrival here, for silver was then 75, but when he got here it was 71 and his plans were all upset. The rumor now is that the fewest men possible to keep the property intact would be put on at $2 and $2.50 per day. We have no idea what the men think of this plau, except we think that it will be close figuring for a miner with a family to live in Anstin on from $55 to $70 per month; and we also think it will he difficult, if not impossible, for the company to make the mines pay at those wages, at the present price of silver.

Silver Peak District.

BAING WORKAU. — Inyo *Register*, July 13: Nicholas Stroesser, of this old Esmeralda camp, furnishes the following information: The Silver Peak group of mines, owned by John Blair of New York, is being worked hy men under Sam Wasson. The hreaking of a cam in the mill shut that down temporarily, but it was expected to start again this week, 10 stamps of the 30 in the mill being in regular use. About 200 tons of ore are now out, and mining will be resumed as soon as this is run throngh. Some 20 men are kept husy hy these operations. The group comprises 20 different mines, which are worked systematically bnt with the constant object of taking out only paying ore. The deepest work heretofore done in the group is not more tban 100 feet under grouud, and at present nothing is heing done lower than 35 feet down. Wood is abundant and water sufficient for the steam power used. The ore is gold, running about $25; $18 rock will meet expenses. The ore is packed two miles and hauled eight more to the mill. The nearest railroad point is Candelaria, 60 miles away. Johu Chiatovich is making a big thing out of the tailings which have heen accumulating at Silver Peak for 20 years past, using the cyanide leaching process on them. A little is being done at Lida and Tule Canyon, the latter heing chiefly placer work. Auy actiou favorable to silver would boom that section; as it now is, the only properties being worked are those yielding enough gold to pay of itself.

Silver King District.

THE FURNACA.—Pioche *Record*, July 13: Jack Wheatley was in town this week from Silver King dietrict. The furnace iu which he and his brothers are interested ie not completed, and the condition of the eilver market is such that it is doubtful if auything more will be done toward the erection of the worke this season.

Taylor District.

A MILL-RUN.—White Pine *News*, July 15: The Monitor mill was started up last Sunday on ore from the Taylor mines. The run will last about three weeks, and will probably end the company'e operation at Taylor for some time, if not altogether.

Tuscarora District.

DIVIMAND.—Tuscarora *Times-Review*, Jnly 15: The Dexter Mining Co. of thie district, which have just completed a successful run at the De Frees mill, yesterday declared a dividend (No. 4) of 25 cents a share. The Dexter has earned the right to be claesed as a gold mine, the ore carrying hut a small percentage of the white metal. The Dexter, with two or three other promising gold prospecte in the lower part of town, are the mainstay of the camp at preseut.

NAVAJO.—The stopes above the 150-foot level are looking about the same; those above the 350 are not looking ae well.

BALLE ISLE.—The eouth intermediate No. 2 ahove the 250-foot level has heen extended 5 feet; veiu small, but good grade. Stopes are looking as usual.

White Horse District.

FREE GOLN.—Reno *Journal*, July 15: Lonis Cohn, Will Biggs and B. Campbell have located a miue in White Horse district which promises to be valuable. Pieces of quartz from the croppings show free gold, and, when pounded up and washed by the old pan process, gives good resnlts. The White Horse mines carry very little silver, bnt samples of the ores brought to town are rich in gold.

ARIZONA.

WHITA HILLS.—Kingman *Miner*, July 15: The White Hills Company continnes to send in ore from their mines. Robert Gray and L. Kimerly are working on a claim near Stockton Hill and are getting some good ore. Logan's team got in from the Gold Bng mine Wednesday morning after hauling ont a lot of machinery for nse on the mine. The Clack Bros. have returned to work on the Prosperity mine, in Todd Basin. They will pile up their ore and await the raise in the price of silver. Ed Williams and Ed Mervine have qnit work on their miues in Aubrey district, the continued low price of silver having utterly disheartened them. Charles Sherman and John Barry were in town this week outfitting for a prolonged prospecting trip to Minnesota mining district. They expect to strike some good gold ledges. W. R. Donnell, H. M. Barry and Jack Kenny took a trip over the southeru part of the county this week. They say that they failed to find a single man at work in the mines of that region. It is said that a gold mill will soon be erected in Rnstler Camp, on the banks of the Colorado river, to work the rich ores of that camp. The prospect for a brilliant fntnre for that camp is good. Stinson & Collins have a spleudid showing of high-grade copper-gold ore in sight in the Blackfoot mine, near Stockton Hill. The ore is generally shipped to Newark, New Jersey, for reduction. Peter Caffrey is still working away on the Alpha mine and is takiug out good rock. This is one of the best properties in the district, and when silver takes an upward turn it will be worked profitably. Mix, Jackson & Cleve are working on an extension of the I. X. L. mine in Wallapai mountaius. They have a fine showing in silver, and it is to be hoped the white metal will go to standard rates to allow them to continue the good work. The hoist on the Rural mine at Mineral Park is in rnnning order, and the water is being pumped out as fast as possible. As soon as the shaft is cleared work will be commeuced on the lower levels, and sinking will also be pushed as rapidly as possible. B. W. Brown, of the Music Monntain Mining Company, has returned to Hackberry from Sau Francisco. He has four men at work developing the water supply at Music Mountain, and, as soon ae a sufficient supply ie obtained, he will start up the mill and mine. An effort is being made to have the Wallapai Iodian reservation, near the Grand Canyon of the Colorado, thrown open. The reservation is of no earthly use to the Indians, and the sooner it is opened up the better it will be for prospectors, as the mountaius in tbat country are filled with mineral. R. G. Patterson has purchased the whim used on the Crescent mine, and has put it up on the main shaft of the Prince Albert mine, at White Hills. He will coutinue to siuk the shaft to a depth of over 200 feet with the whim, and will then erect hoisting works to further prosecute exploitation.

MINING SALE.—Prescott *Courier*, July 13: The only transfer of mining property of any note in the Uoited States within the last 30 days took place last Saturday, when Chicago capitalists purchased a group of gold mines, 17 miles from Prescott, the purchase price being $100,000, the purchasere stipulating to have a complete 20-stamp mill in operation on the properties withiu four mouths. The properties purchased are the Yankee Girl and Silverton mines, owned by Meyer & Slack, and the American Flag and Invincible mines, owned by Messrs. Butler, Bliss & Kelly. The purchasers will take charge of the properties ten daye from date of purchase. The 20-stamp mill is to he erected on Big Bug creek, not far from the site of the Williscraft mill. These properties have heen among the most steady gold-producers and ore-shippers in this section, and euch a sale at this particular period of mining depression shows well for the gold belt aronud Prescott, as well as for tue good work of the men who brought about the sale. The *Courier* underetands that Wm. Vanderbilt and H. N. Palmer hrought about the sale, which has already added considerably to the amouut of money circulating in Precsott.

ACTIVA MINING.—Mesa *Free Press*, July 13: Active work is now being prosecuted on the Mammoth mine in Snperetition district. Thirteen men were put to work on Thursday taking out ore and others will be put on as rapidly as possible. The camp will he supplied with water from a shaft in which there is 15 feet of water. The pump aud machiuery are on the ground and will be put in at once. A portion of the 20-stamp mill is on the cars at Tempe and will be transported to the miue at once. Ore hy the carload is being shipped to Denver for reduction. The prospects of the district grow brighter day by day.

BRITISH COLUMBIA.

EAST KOOTENAY MINING NEWS.—Nelson *Tribune*, July 12: The concentrator of the Thunder Hill mine, on the shore of Upper Columhia lake, in East Kootenay, is in operation, and the first shipment of cencentrates was expected at Golden thie week. The East Kootenay Exploration Company now has its hydraulic plant in operation on Wild Horse oreek, and will run day and night until the end of the season. The grounds are illumiuated at night hy fonr arc lights of 1000-candle power each, the power being furniehed hy a Pelton wheel. The company employs 20 white men and no Chinese. The boud on the North Star miue, on St. Mary'e river, will expire soon, and the parties holding it are shoving work on the mine with the view of taking up the bond. Dau Maun, the railroad contractor of Winnipsg, is one of the parties interested. The McMnrdo basin is almoet free from snow, and the trail leading to it from Carbonate landing ou the Columbia river, 15 miles ahove Golden, is reported in good coudition.

SILVAA MINES NOT WANTAU.—W. A. Jowett, who went to England last winter to make a deal on mining property in the Lardo country, retnrned to Nelson on Monday, coming in from Bonner's Ferry on the State of Idaho. Mr. Jowett left England on Jnne 10th. He says it is uselese to attempt placing silver mines in England at present, not because of a scarcity of money, bnt because of the belief prevailing over there that silver has no stable value. While he did not meet any of the Silver King people, he heard of them. It is understood that the property is stocked, although the stock is not offered for sale publicly; it is being placed among personal friends of Mr. Ramsay. In England, money is locked up awaiting investment iu gilt-edge American securities at an opportune time, that is, when the price of the securities is dowu to bed rock.

DAKOTA.

HEAVY PLACEA MINING.—Deadwood *Pioneer*, Jnly 15: Further inqniry into the rumor of preparations for a system of extensive placer mining on Castle creek, referred to iu these columns Saturday morning, seem to verify the report as correct. A gentleman who was in from Mystic yesterday informs us that such a company as we referred to has really heen organized, with a working capital of $125,000. The company, he states, is made np of English capitalists and was organized by Donald Dennis. The operations will be begun near Mystic, and much of the machiuery is now ou the ground. The plan of operations, our informant states, is to build a large flume along the side of the stream, then build dams as the work progresses up the stream, and, by means of powerful steam pumps, pump all the water of the stream into the finme, thus affording a clear channel for the steam shovel to operate. It's a pretty big undertaking, and if it can be made to work there seems no reason why it should not prove profitable.

BALU MOUNTAIN GOSSIP.—Reports from the Bald Mountain country indicate a quite general livening up of matters among the prospectors, and more work is being done than at any previons time this season. The outlook is generally good, and in some instauces men who have been pegging away faithfnlly for a long time seem to be meeting with the encouragement they have so long been looking for.

THE HOASESHOE —Results in no mining property in the Black Hills are being watched with more general interest at present than in the Horseshoe group. This is natural from the extent of the property, embraciug some 400 acres, and the large sum epent in prospecting and developing it, the shaft being over 350 feet deep, with, at the present writing, 350 feet of drifting on that level. The drifts run east and west, the one to the east being in about 200 feet, and that to the west 150 feet. There hss been no material change in the property during the past week, by which is meant that no large body of ore has been struck. In all, five distiuct ore chutes have heen cut in the two drifts, bnt none of them have been followed any material distance. Thomas H. White, to whose energy is mainly dne the extensive work on this property, has been sanguine from the first that it holds an immense body of ore, and the resnlts thus far have in no measure weakened his faith. There are couditions in all miuing properties which owners do not always care to make public, and, while Mr. White can scarcely be asked to give a detailed description of the workings in his ground, he has said efficient to the writer to warraut the conclusion that he is well satisfied with the outlook, and those who have beeu hoping to eee the Horeeehoe develop into an important mine will in all human probability uot he disappointed.

NEW MEXICO.

DEVALOPMENT WORK.—Silver City *Enterprise*, Jnly 14: The Maud S. mill started up Wednesday. The Colonial mill at Mogollon resumed operations Wednesday. The Viola mine at Pyramid is working a force of 15 men, and ie preparing for the silver boom which is eure to come in the near future. Dave Darling has a lot of rich eilver ore on hand which he extracted from his Red Cloud mine at Black Hawk. He proposes having it worked at home if possible. The Mogollon mines continue to operate despite the fact that silver ie nnder a cloud. As one-third of the hullion product is in gold, thie fact may help that section out and euable it to tide over the period of depression. Work on the Confidence mill grade at Whitewater is about completed and operations on the wagon road will be resumed immediately. About 1½ miles of grading will be required to reach the mine, but as a good portion of it is hlasting ground, it will require some time to complete it. A rich gold strike is reported from Copper creek, in the Mogollons. W. J. Burns is the lucky man this time, and the original owners of the property on which the find was made have ample time to rnminate. It appears that the old owners always chose a soft spot, not on the ledge, where their annual assesement work was done. Had they made the mistake of sinkiug on the vein, and hy eo doiog developing that property, they wonld now be resting in ease and comparative affinence. The vein ie four feet wide, is well defined, and aseays show 18 ounces in gold and 3 ounces in silver.

OREGON.

GOLN FIALNS.—J. M. Hagerty in *Oregonian*, July 15: "After carefolly examining the various mining properties in southern Oregon, I have come to the conclusion that mining is only in its infancy in that sectiou of the State. In formation and climate it is an ideal mining couutry, and the cheapness of labor and provisions and the railroad facilities make it possible to operate mines with a comparatively emall outlay of capital. But it has been held back, and still is, to a great extent, by reason of a hostile feeling on the part of the old-timers, properly called 'mossbacks,' against quartz-mining. There was no qnartz-mining carried on in early days, and they do not believe in it. Then, too. there has been a great deal of mineral land fraudulently taken np under the timber and stone act, and they do not want it exposed. The country from Roseburg to Ashland was not originally settled by mining men, but by 'camp followers,' who, delighted with the climate, soil and the possibility of making a good living with little labor, squatted in the valleys and raised cattle and fruit sufficient for their own use, and were satisfied. Then the Oregon & California Railroad was built, bringing in new blood and new conditions; bnt the country was still agricultural. Since 1850, mining has been carried on on a small scale, except in one or two instaoces, nntil about three years ago, when a few prospectors from California aroused some interest in quartz-mining. But it has not been until within the past year that this new movement has received any real encouragement. Tbe development of the Ashland mine proved tbe fact that there were good-paying ledges in that section, and gave encouragement to a large number of prospectors. The majority of the ledges found, however, and espscially the larger ones, are either barren on top or so low grade as to be unprofitable to work. The owners of the Ashland mine are entitled to a great deal of credit, as well as the profit they are making, for the determined manner in which they continued the development of their property under what seemed the most discouraging outlook. The country between Jacksonville and Gold Hill is very rich in pockets. It is from that section that so many reports of rich strikes originate. There is no doubt that mauy miners have found pockets from which they have taken out from $500 to $5000 in a single day; but that does not mean that they have discovered a mine, for that single day's work, in all probability, has sufficed to entirely clean out the pocket.

UTAH.

GLOOMY OUTLOOK AT PARK CITY.—*Record*, July 15: The outlook for the miuing ioterests in Park City is rapidly assuming as gloomy an aspect as that reported from many other States and Territories, and it is hard to say just what the result is going to be. The situation may be summed up about as follows: The indications are that the Ontario and Daly properties will be kept working, though perhaps at reduced wages. A couference between Supt. Chambers and a committee from the miners will be held to-morrow or Monday and the question settled. At the present time, both mines and mills are working full force at the old wages and will continne so until after the conference between Mr. Chambers and tbe committee. The Crescent is closed down tight, and, owing to the fact that the smelters will uot purchase ore, and that money cannot be borrowed even ou gilt-edged security, tbe company is unable to pay its men off and is consequeutly feeding them at the miue boarding-honse until matters take a more favorable turn and the company is enabled to market the large qnantity of first-class ore and coucentrates that it has out and ready for shipment. The Crescent, under reasonable conditions, can pay its way, while recent developmeuts on the 400 level give great promise of placing the mine in a positiou to restore the confideuce of its many stockholders; but the present unexpected and disastrous drop in the white metal has practically throwu the mine on its beam ends and stopped all developments. The Alliance tunnel is uow ready to go over to the Crescent Company, but, owing to the present outlook, nothing will be done in the way of exteneion. If the Government destroys silver, there will he no occasion to extend the tunnel and tap the Crescent veiu at depth, and the company proposes to wait for developmeuts. The mine will not be opeued up again nntil there ie a change for the better. The Anchor has aleo closed down, the force that was put to work last week stoping first-class ore having eince been laid off. The mine is now silent, and will not agaiu resume until there is a change for the hetter and a permanent price, at leaet for silver, is established. The officere of that property claim that it is now, with fair prices for hoth eilver and lead, in a coudition to pay expenses and lay by a surplus for dividende, and it is much regretted that the present state of affairs should place a damper on developments. No attempt will be made to reeume until silver ie established on a permanent basis. Many improvements were contemplated hy the company, hnt have all been abandoned. The Silver King property is perhaps the hest equipped of any mine in the camp to extract ore at a profit under present conditions, yet the management claims it is an impoesibility, and the King is numbered among the eilent majority. Many exteneive improvements, among which was an enlargement of the present shatt to three compartments, were in contemplation, but has heen abandoned for the present. The Silver King is a great mine, but cannot work at a profit with silver at its present fearfnl discount, hence the mine will remain closed until hetter prices are obtainable. Many other properties are also closed down, owing to the eame cauee, and among them may he mentioned the Daly West, Mayflower, Apex, McHenry, three jigging plants and a whole raft of small prospects, employing from two to twenty meu, all helping to swell the number of idle men. Nearly all the promising prospects in course of development in this district have been closed down, the men claiming that it is folly for them to epend either time or money in pursuit of something that may never he of any value. The only one that remains active is the Cnmherland group, owned and operated by John Bogan and others.

Market Reports.

The Markets.

SAN FRANCISCO, July 20, 1893.

During the past 60 years the highest prices for silver bullion in London was in 1859, viz., 62¼d per ounce standard; and the lowest official quotation was 30½d, on June 30, 1893. The Sherman law requires Government purchases from time to time of silver bullion "to the amount of 4,500,000 ounces, or so much thereof as may be offered, in each month, at the market price thereof, not exceeding $1 for 371.25 grains of pure silver," etc. It is not obligatory, therefore, on the part of the Government, as commonly supposed, to purchase 4,500,000 ounces in each month, unless that quantity be offered at "the market price." London determines the price, and the Government rejects all bids not in conformity with the same.

The compulsory purchase in each month of 4,500,000 ounces would mean an absorption of 54,000,000 ounces annually, says the *Examiner*. Only since 1889 has the annual production of silver in this country exceeded that amount. The year in which the Sherman law was passed, 1890, the production rose to 54,516,300 ounces and to 58,330,000 ounces in 1891. In 1892 there was a small falling off. From 1793 down to 1873, the year in which the coinage of the old silver dollar was suspended, only 8,045,838 of these pieces were emitted. The coinage of 412½ grain dollars was resumed March 1, 1878, and down to March 1st of the present year 418,931,675 had been coined. During the first year after the silver dollar had been restored to currency, more than three times as many were coined as during the 80 years in which the old dollars had their run. The latter, owing to their being intrinsically more valuable than the gold dollar, were either exported out of the country or melted down.

The Metals.

Tin has shown greater strength during the week. Copper and lead have shown no important changes.

San Francisco Metal and Coal Market.

ANTIMONY.		**STEEL.**	
Per lb	— @ 14	English, lb	— @ 18
BORAX.		Canton tool	— @ 8¼
Refined, in car lots	— @ 7½	8/k Diam'd tool	8½@ 15
Powdered, do	— @ 7¼	Pick & Hammer	6½@ 10
Concentrat'd, do	— @ 6¾	Machinery	4 @ 5
All grades jobbing at advance.		Toe Calk	— @ 4½
COPPER.		**TINPLATE.**	
Bolt	22 @ —	S. V. steel grade	
Sheathing	22 @ —	14x20, spot	— @ 5 87½
Ingot, jobbing	— @ 14½	Charcoal, 14x20	— @ 5 87½
Do, wholesale	— @ 13½	Do roofing, 14x20	— @ 5 87½
Fire Box Sheets	22 @ 24	Do, do, 20x28	— @11 75
IRON.		**PIG TIN.**	
Bar, base	— @ 3	Spot	— @ 24
Norway, base	— @ 4½		

PIG IRON.	Spot.	COAL.	
Eglinton ton	20 00@— —	SPOT FROM YARD—PER TON.	
Glengarnock	21 00@— —	Wellington	$8 00
Am. Soft, No. 1	22 00@— —	Creta	7 50
Shotts No 1	22 00@— —	Nanaimo	5 50
Puget Sound	20 00@—	Gilman	6 00
Clay Lane White	21 00@— —	Seattle	5 50
Langloan	22 50@— —	Coos Bay	5 50
Cartsherrie	22 50@— —	Cannel	8 50
Barrow	22 50@— —	Egg, hard	12 00
Carnoffect	22 00@— —	Wallsend	7 25
CHROME IRON ORE.		Scotch Splint	8 00
Per ton	10 00 @— —	Brymbo	7 50
LEAD.		West Hartley	8 00
Pig	— @ 4½	TO LOAD—PER TON.	
Bar	— @ 5½	Australian	6 37@— —
Sheet	— @ 7½	Liverpool Steam	5 50@— —
Pipe	— @ 6¾	Scotch Splint	00@— —
SHOT.		Cardiff	5@— —
Drop, sizes *smaller* than		Lehigh Lump	11 00@— —
B, in bag of 25 lbs	$1 80	Cumberland	12 00@— —
Do do, B and *larger* sizes		Egg, hard	10 00@— —
bag of 25 lbs	2 00	West Hartley	7 50@— —
Buck, Balls and Chilled			
do, bag of 25 lbs	2 00		
QUICKSILVER.		**COKE.**	
Home trade, pr. flask	42 50 @43 00	English, to load	$9 50@10 00
		Do, spot, in bulk	—@10 00
		Do, in sacks	— @11 50
		Cumberland	9 50@— —

NEW YORK, July 20.—Following are the closing prices for the week:

	Silver in—				
	London.	N. Y.	Copper.	Lead.	Tin.
Thursday	.33	71	10 25	3 62½	19 55
Friday	.33⅜	72	10 25	3 55	19 25
Saturday	.33⅜	72½	10 25	3 50	19 25
Monday	.33¾	72¾	10 15	3 55	19 00
Tuesday	.33½	71½	10 20	3 55	19 10
Wednesday	.33	70½	10 25	3 62½	19 20

Mining Share Market.

The mining stock business just now is even worse than most other kinds. Prices are about as low as any one could wish. There is a desire on the part of the managers of the mines to put them on a better footing, and, if this had been carried into effect a long time ago, affairs would not now be so bad. The presidents, secretaries, superintendents and other head officials of the companies have voluntarily agreed to submit to reduction in their salaries, and the railroad, the mills, the supply companies and the miners will be asked to make a reduction in proportion. If this is done, there will be a revival on the Comstock such as it has not had for years, for a class of ore which cannot now be extracted, and which runs high in gold, can be profitably worked, thus giving employment to more men, and making assessments few. The greatest difficulty will be experienced when it comes to cutting down the men who do the real work at the mines. The underground men earn all they get. At the same time, rather than give up work altogether, they may have to accept smaller wages.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, July 20, 18 3.

9:30 A. M. SESSION.

160 Best & Belcher	50c	100 Ophir	70c
50	55c	100	55c
300 Con. Cal. & Va	1.20	100 Savage	15c
300 Crown Point	35c	100 Sierra Nevada	40c
200	40c	50 Union	35c
300 Hale & Norcross	10c	200 Yellow Jacket	50c
50 Mexican	40c	100	55c

2:30 P. M. SESSION.

100 Belcher	30c	200 Ophir	70c
75 Best & Belcher	50c	200 Potosi	50c
300 Bullion	20c	100	45c
100 Chollar	30c	100 Overman	10c
100 Con. Cal. & Va	1.20	1000 Savage	15c
100 Con New York	5c	300 Sierra Nevada	45c
100 Mexican	40c	100 Union	35c

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

The following brief list by telegraph, for July 18th, will appear more complete on receipt of mail advices:

California—Elton B Shaw, Los Gatos, evaporating pan; Geo. r. Volght, Lower Lake, swinging gate; Matilda S. Broun, Berkeley, detachable umbrella cover; Augustus Knudson, San Francisco, steam engine; William P. Courtney, Oakland, grip opener; Lee D. Craig, San Francisco, removable sidewalk for cars; George Simpson, Santa Barbara, dental articulator; Joseph W. Holmes and F. C. Gilmore, Los Angeles, root block; Bernard Toulouse and J. Delorioux, San Francisco, mosaic and tile press; James S. Brownell, San Francisco, bolt for ore concentrators; William F. Bowers, San Francisco, guide support for hose reels.

Oregon—John F. Needham, Mount Tabor, steam boiler furnace; Thomas B. McDermott, Portland, car coupling.

Washington—Charles J. Best and W. A. Hall, Seattle, two patents for apparatus for treating garbage or like wastage; Olans B. Jacobs, Fremont, car axle bearing; William H. Crain, Penawawa, spring gun.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

GAS-GENERATOR. — James Nolan, Oakland. No. 500,936. Dated July 4, 1893. The object of this invention is to provide a simple and effective gas-generating apparatus, and particularly one which, by reason of its reversibility is capable of continuous operation.

LAND-LEVELER.—Wm. Falconer, Selma, Fresno Co. No. 500,874. Dated July 4, 1893. This earth-scraper for leveling land consists in a scraper-carrying frame constructed and adapted to be readily and quickly applied to the running gear of any farm or other country wagon, said frame having novel mechanism for lifting and depressing the scraper. The object of the invention is to provide a land-leveler which can be readily, easily and quickly applied to the running gear of any ordinary wagon by simply removing the bed, uncoupling the reach and setting the scraper-frame on the wheeled axles; also to provide a land-leveler having a peculiarly mounted scraper with simple and convenient means for raising it from and for depressing it into the ground.

AIR MOTOR.—John P. Foulks, Verdi, Nev. No. 500,877. Dated July 4, 1893. The object of this invention is to provide for the unlimited application of the force of the wind to drive a series of double wheels, and apply the power to a continuous shaft, so that the power may be increased by adding any number of wheels and connecting them with it. In carrying this out the inventor uses a series of horizontally journaled double wheels, situated one above another in one or more towers, and which are revolnble upon a central hollow axis for the purpose of presenting the wheels with their faces to the wind or throwing them out, and a central shaft extending through these hollow shafts receives motion from the wind-wheels through suitable gearing, the motion of this shaft being again transmitted to a horizontal shaft, which may receive the power of several sets of these wheels.

CABLE-RELEASING DEVICE AND CROSSING.—A. Jeffreys, S. F. No. 500,903. Dated July 4, 1893. The invention relates to a novel device for releasing the grips of cars from the cable at an instant before another line of cable which crosses the first one is reached, and a means for automatically carrying the grip over the crossing cable to prevent contact therewith. In the construction of cable roads it is often necessary to carry one road transversely across another. In such cases one of the ropes must pass beneath the other one, and it will be manifest that the grips of all cars which are driven by this lowermost cable must be released just before the uppermost rope or cable is reached, in order to prevent the grip from being forced against the other rope and injury done. This invention is designed to provide a device for automatically releasing the grips without the necessity of any attention from the gripman, and the lifting of the grip when so released and transferring it over the other cable.

MINING SHAREHOLDERS' DIRECTORY.

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ASSESSMENTS.

COMPANY AND LOCATION.	NO.	AMT.	LEVIED, DELINQ'T AND SALE.	SECRETARY.
Alhambra M Co, Nev	17	25c	July 14, Aug 18, Sept 11	F S Schwarze, 324 Washington
Alta M Co, Nev	43	15c	April 25, Aug 4, Aug 15	L Osborn, 309 Montgomery
American and Mexican M Co	10	20c	June 28, July 31, Aug 19	F M Husted, 528 Montgomery
Best & Belcher M Co, Nevada	54	25c	June 6, July 14, August 4	L Osborn, 309 Montgomery
Crocker M Co, Arizona	14	5c	June 8, July 13, August 3	A Waterman, 309 Montgomery
Crown Point M Co, Nevada	61	25c	June 12, July 18, August 8	J Newlands, Mills B'ld'g
Derbec Blue Gravel M Co, California	11	5c	May 31, July 5, July 27	T Wetzel, 320 Sansome
Exchequer M Co, Nevada	36	10c	June 29, Aug 1, Aug 29	C E Elliot, 309 Montgomery
Gold Mountain M Co, Cal	5	8½	July 13, Aug 16, Sept 4	J F D Curtis, 325 Montgomery
Gray Eagle M Co, California	33	—	July 10, Aug 16, Sept 14	C C Harvey, 309 Montgomery
Hale & Norcross S M Co, Nevada	101	50c	June 21, July 27, Aug 18	A B Thompson, 309 Montgomery
Mexican M Co, Nev	48	25c	July 17, Aug 22, Sept 12	C E Elliott, 309 Montgomery
Occidental Con M Co, Nevada	13	10c	June 22, July 26, Aug 17	A K Durbrow, 309 Montgomery
Peer M Co, Arizona	16	5c	June 8, July 12, August 2	A Waterman, 309 Montgomery
Peerless M Co, Arizona	20	5c	June 15, July 20, Aug 10	A Waterman, 309 Montgomery
Potosi M Co, Nevada	38	25c	July 11, Aug 15, Sept 5	C E Elliott, 309 Montgomery
Red Jacket Cons M Co, Nevada	1	5c	May 24, July 15, August 5	S M Capp, 415 Montgomery
Savage M Co, Nevada	31	25c	June 20, July 25, Aug 14	E B Holmes, 309 Montgomery
Silver Hill M Co, Nevada	33	5c	May 29, July 5, July 28	D C Bates, 309 Montgomery
Utah Cons M Co, Nevada	18	10c	June 16, July 18, Aug 5	A W Havens, 309 Montgomery
Ventura Asphalt Co, Cal	1	5c	July 11, Aug 26, Sept 18	F. A. Brooks, Monty Block
Weldon M Co, Arizona	7	5c	June 15, July 16, Aug 9	A Waterman, 309 Montgomery

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Dora G M Co, California	Annual	J. Blumenthal, 415 Montgomery St	July 27
Lady Washington M Co, Nevada	Annual	L Osborn, 309 Montgomery	July 28
Live Oak Drift M Co, California	Annual	F Chappelet, 315 Montgomery	July 22
Mountain Tunnel Gravel M Co, Cal	Annual	E C Landis, 219 Sansome	July 27

DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE
Bulwer Cons M Co, California	5	L Osborn, 309 Montgomery	Oct 20
Champion M Co, California	10	T Wetzel, 310 Pine	May 15
Cons New York M Co, Nevada	10	C E Elliott, 309 Montgomery	Feb 15
Great Western Quicksilver M Co	25	A Halsey, 328 Montgomery	Oct 8
Mayflower Gravel M Co, California	10	D M Kent, 330 Pine	June 30
Pacific Coast Borax Co., California	1 00	A H Clough, 230 Montgomery	Jan 10
Standard Cons M Co., California	10	J W Pew, 310 Pine	July 25

Books on Working Ores.

BY GUIDO KUSTEL, M. E.

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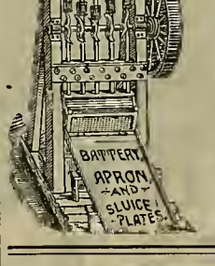

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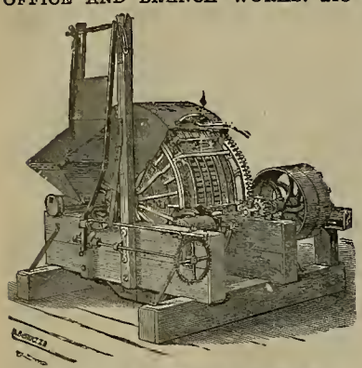

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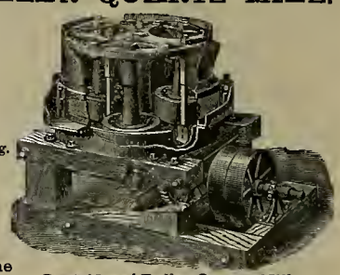

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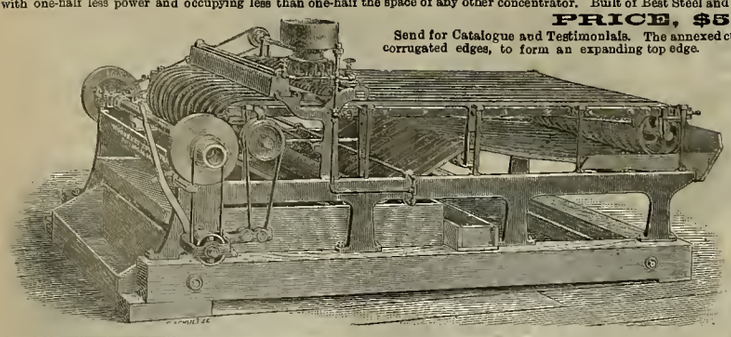

THE SAN JACINTO ESTATE—Office of the General Manager. CAJALCO, Oct. 30, 1891.

GEO. E. WOODBURY, ESQ.—Dear Sir: In reply to yours of the 27th inst., respecting the working and efficiency of the "Woodbury" Concentrator placed in our works by you, I am pleased to inform you that it is giving entire satisfaction; it has a much greater capacity than any other machine, and is doing fully one-third more work, with the concentrates equally clean, as from either of the machines at work here

[Copy] Yours faithfully, S. HARRIS, Manager.

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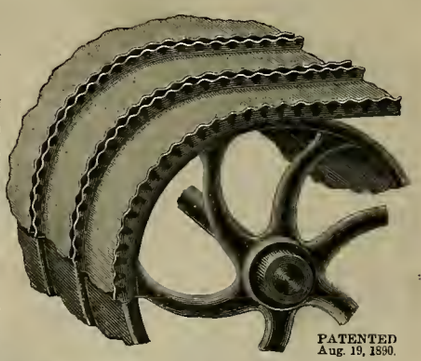
GEO. E. WOODBURY: Your letter of inquiry about your concentrator came to hand in due course. Your machine is doing well, the motion is all right, and the machine is giving entire satisfaction. Yours faithfully S. HARRIS.



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SAN FRANCISCO, SATURDAY, JULY 29, 1893.

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A High-Speed Electric Locomotive.

The first electric locomotive of any considerable size in the United States, and the first practically operative high-speed electric locomotive in the world adapted to the steam railroad, has recently been completed at the Lynn works of the General Electric Company, and will shortly be exhibited at the World's Fair. Its completion marks a distinct advance in electrical development.

It is a 30-ton locomotive, designed for a normal speed of 30 miles an hour, primarily intended for operation on elevated railways, and for passenger and light freight traffic on less important steam roads. It is of compact construction, solidly and substantially built, and runs on four 44-inch wheels. Its dimensions are: 16 feet 6 inches long, 11 feet 6 inches high, 8 feet 4 inches broad, having its draw-bars 2 feet 6 inches from top of rail—the Manhattan elevated railroad standard height. The draw-bar pull is calculated at 12,000 pounds.

GENERAL ELECTRIC COMPANY'S HIGH-SPEED ELECTRIC LOCOMOTIVE HAULING TRAIN.

The propelling power is furnished by two electric motors of especial design and construction, each axle being provided with one motor. The motors are gearless, and are supported on spiral springs resting on the side frames of the locomotive truck. This method of suspension leaves the wheels free to adjust themselves to the irregularities of the road-bed, and consequently the wear to both tracks and motors is diminished.

The motor fields consist of massive iron castings, to which the hollow field spools are bolted. The armatures are of the iron-clad type, having each separate winding embedded in a mica-lined slot cut into the curved surface of the laminated iron armature body. The axles of the locomotive pass through the hollow shafts on which the armatures are mounted. These shafts rest in bearings of the motor frame, and are connected to the axles by universal couplings, which allow of freedom of motion in all directions. The commutators are of massive construction, and there are four sets of brushes to each commutator.

The motors are controlled by means of a series parallel controller set up in the interior of the cab. This device embodies all the latest improvements made in this type of apparatus by the General Electric Company. Under test it is found that the series parallel controller allows of a more gradual and easier starting of the electric motor, and the speed can be more delicately and instantaneously controlled than in the case of the steam locomotive.

The truck, suspended from the journal boxes, is constructed of heavy I beams, and forms the foundation for the locomotive cab, of sheet iron, of symmetrical design, and so curved off as to diminish the atmospheric resistance as far as possible. The interior is finished in hard wood. Two sliding doors are placed at each side of the cab, and the windows are so arranged as to permit of an unobstructed view in all directions. There is ample space in the cab for the motorman's movements, and it affords him considerably better protection than that usually vouchsafed the steam locomotive engineer. The air for the brake is supplied by a special electrical air compressor, which also operates the whistles. This air pump has an oscillating cylinder of 6 inches diameter with a 6-inch stroke, supplying 6000 cubic inches of air per minute at 70 pounds pressure. The normal speed of the armature shaft is 675 revolutions, and of the crank shaft of the pump 110 revolutions. The dimensions of the air compressor are, length 41 inches, width 16½ inches, height 25 inches. The pump motor is controlled by a special rheostat. This, by an intermediary device, is automatically regulated by the air pressure.

This locomotive has been designed for a normal speed exceeding 30 miles per hour. The use of these locomotives over very long distances is at present limited only by the cost of long lines of electric feeders, and until the problem offered by this condition is solved, restriction of its employment must necessarily exist. But for places comparatively near each other and where traffic is dense—the more dense the better—the electric locomotive is peculiarly adapted, for here all the advantages of electric propulsion are available, unhampered by the extreme expense involved in long feeder lines.

The evolution of the use of the electric locomotive will probably follow along the lines dictated by expediency and favoring conditions. At first they will probably be used in elevated railroad service, and in New York, Brooklyn and Chicago alone their advent will be hailed with a feeling of deep gratitude. They will then probably be adopted as feeders to the trunk lines, both for freight and passenger traffic, and to operate short suburban lines, where a rapid, efficient service is requisite. Their peculiar fitness for switching purposes will advance their use another step, and then, slowly as the different problems presented are overcome, they will invade the province of the trunk-line steam locomotive.

Fig 11.

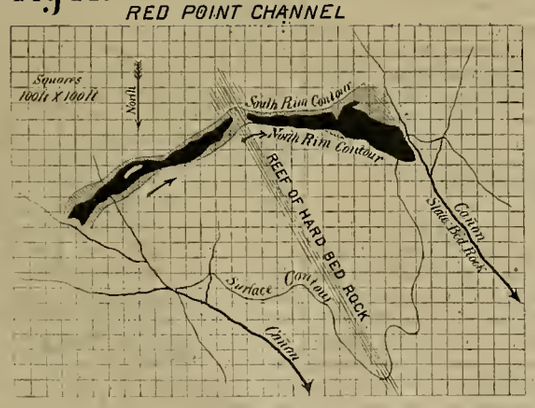
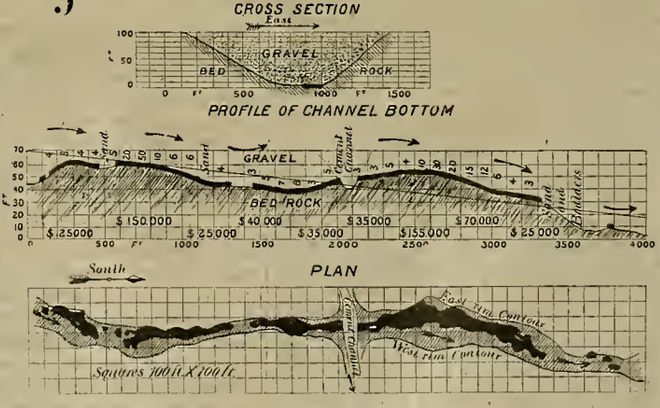


Fig 13



AURIFEROUS GRAVEL CHANNELS OF THE FOREST HILL DIVIDE—See Page 67.

THE Oakland Gas, Light and Heat Company is preparing to double the light plant at the foot of Jefferson street.

MINING AND SCIENTIFIC PRESS.

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W. B. EWER. }
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Entered at the S. F. Postoffice as Second-Class Mail Matter.

San Francisco, July 29, 1893.

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Comment.

At a meeting the other day of the Executive Committee of the State Anti-Debris Association, Manager Phipps submitted his report, in which he said:

"The work of the watchmen reveals the fact that there is some hydraulic mining on the North Ynha river in Sierra county, in violation of law, operated by prominent members of the Miners' Association. In order to ascertain the ownership of these mines, the manager, W. T. Phipps, accompanied by his wife, went to the Recorder's office at Downieville on the 11th inst., and on requesting to be shown the connty records, and without introducing himself, was by the Recorder, Mr. Moore, refused the privilege of either examining or being assisted in examining the records. The fact that the Recorder several times called his name convinced Mr. Phipps that his business was suspected, and that the Recorder's object, as he virtnally admitted, was to prevent the desired information heing obtained."

It does not seem to us nece:sary for Mr. Phipps or any other anti-debris man to misrepresent facts simply to make a point against the Miners' Association. He first says the law is being violated by prominent memhers of the Miners' Association, and then says he was unahle to ascertain the ownership of these same mines, because the Recorder refused to let him see the records. If he tried to find out from the Recorder, and could not find out, the names of the owners of these mines, how could he know they were "prominent members of the Miners' Association?" The two stories in the eame report do not fit well together. We do not uphold any miner who hreaks the law or any Recorder who refuses permission to any citizen to examine public records; hut hecause some men may be mining contrary to law, it does not follow that they are prominent members of the Miners' Association. That association has officially and privately condemned those miners who persist in illegal mining, a fact which Mr. Phipps very well knows. If people who happen to be members of the association violate the laws, they do it against the remonstrance of that association and not hy its sanction, permission or aid, and are worse enemies to the miners' cause than the professional anti-dehris agitators themselves. But in this instance there is no proof to hack up Mr. Phipps' statement that these men in Sierra county are even members of the Miners' Association, much less prominent ones. He himself confesses he was unable to ascertain the ownership of the mines, and in so doing confesses to an unwarranted misrepresentation hy making the other statement.

In some of the silver-mining districts the men are serenely accepting a reduction of wages rather than to he thrown out of employment altogether. In other places they refuse to do this and quit. At Leadville, Colo., as noticed in our Mining Summary, the Miners' Union refused to accept $2,50 per day temporarily and some of the hig mines quit working. On the Comstock, Nevada, a reduction of 25 per cent is expected. At Park City, Utah, a reduced scale of wages has heen accepted and work will go on. While so many thousand men are out of employment in the silver camps it would seem policy on the part of the miners to accept a temporary reduction rather than be out of work for a long time. Under present conditions, unless silver mines can reduce expenses to the lowest possihle point, they cannot be operated.

Within the last 30 days nearly $1,600,000 in fine gold from the mines of this State has been deposited in the U. S. branch mint in this city. California gold mines are now producing considerably over one million a month, with promise of a decided increase dnring the rest of the year. The gold product of the State last year was $12,500,000, but since the cessation of silver mining elsewhere an impetus has been given to gold mining here which will, soon begin to bear fruit. California has hy far the largest and most productive gold-mining region in the United States. It has suffered to some extent for lack of capital for development of prospects and small claims, but it is expected that this will now he remedied. Good "running" gold mines are scarce and in demand. They are hard to find for purchase, as those who own them hold on to them. The smaller claims and prospects are what will have to he taken hold of by people in search of gold properties. There is some risk in this sort of investment, of course, since no man can tell what a prospect will amount to. Only development will prove what such properties are, and this takes money.

The spectacle of the enterprising and rich city of Denver, Colorado, opening soup houses where two or three thousand people a day are fed is a remarkable one. Only a few months ago that city was held up as the model of Western towns in its activity, push and large husiness. How much of the present depression is due to the actual closing down of Colorado mines and smelters, and how much due to the "scare" brought about by predictions of disaster in case of failure of free coinage, no man can say. Denver itself has no mines in its limits or boundaries, though a center for surrounding camps more or less distant. Its smelters and railroad facilities have made it a mining center, and it is naturally affected by the closing down of the mines. Those out of employment gravitate to the city, which is therefore now filled with idle men. It is a difficult problem to know how to care for these people, and it is just now rendered still more difficult by the failure of hanks and general commercial depression, by which those who would otherwise assist are unable to do so. Working people who can leave there are doing so, but many cannot from lack of means. The city is seeing harder times than could ever have been anticipated.

The rich strike in the famous old Virtue gold mine in Oregon will be a disagreeahle surprise to the Salt Lake men who only a few weeks ago forfeited $5000 for the privilege of giving up a bond they had on the property. Mr. Grayson, the owner, has spent a great deal of money on the mine, and has been trying to sell it for a long time. It is prohable that he is now glad he did not make the sale, as very rich ore has been found in the bottom of the shaft, and there are indications of an old-time output. In a gold mine of this kind there are many possibilities, and while the working has been unprofitahle for some years, the expenditures are now apt to he returned with good interest.

The appointment of ex-Governor George C. Perkins as U. S. Senator, to fill the unexpired term of the late Leland Stanford, is pleasing to the mining community of this State, as Senator Perkins has heen a miner himself, has lived among them, and will be in sympathy with anything which will aid and foster the mining industry of California. This State will now have a Senator who has a practical understanding of mining matters.

Col. Geo. H. Mendell, Lieut. Col. W. H. Benyuard and Mayor W. H. Heuer, composing the California Debris Commission appointed under the provisions of the Caminetti law, returned on Monday from a short trip to the hydraulic mining regions of Placer, Nevada and Yuba counties. The object of the trip was to see what opportunities there are for the construction of impounding works. The members of the Commission also wanted to converse with the hydraulic miners and find out what difficulties prevented their applying for licenses to mine. It was the original intention to extend the trip to Plumas county, hnt this was given up and they may go there later on. The Commissioners met a numher of miners and were shown the sites of several proposed dams. They also examined a nnmher of dehris dams already built and were shown several places where there are successful impounding works. The visit of the Commissioners to the mining regions will inspire confidence among the miners and lead to their presenting their petitions for license to mine. Several of the large companies are now preparing to do this.

South African Gold Mining.

The Witwatersrand district, South Africa, continues to show a monthly increase of gold production, and, as more mills are about to he erected—some of them very large ones—the produciion is apt to show a still further increase. The gold retnrns from the camp for the month of May were as follows:

	Ozs.	Dwts.	Value.
From Mill	85,750	14	£310,305
" Concentrates	5,536	16	21,787
" Tailings	21,278	9	64,655
" Alluvial	171	10	520
" Other Sources	4,174	6	14,610
Totals	116,911	15	£411,877

The value of the mill gold is about £3 10s. per ounce, and the cyanide gold £3 per ounce.

This district uses the cyanide process more extensively than any other one in the world. In fact, until this process was introduced, the region did not attract such attention as it does now, nor was its product anywhere near as extensive. Much of the gold now being produced comes from old tailings which had accumulated as the result of former work. These tailings are all being worked by the cyanide process.

The African Gold Recovery Co., Limited, which controls the operation of this process in the camp, keeps a record of the gold produced hy the use of the cyanide. For the month of May, out of the 116,911 ounces of gold produced, 24,004 ounces came from plante operated with this system. This shows an increase from April of nearly 4000 ounces, due to the use of the cyanide process. The record is as follows:

AFRICAN GOLD RECOVERY CO., LIMITED.
May Production.

	Ozs.	Dwts.
Caledonia Works	67	7
Crown Reef G. M. Co., Ld.	1,922	0
New Rntfonteni Co., Ld.	985	19
Nigel G. M. Co., Ld., (Concentrates)	508	10
" " " (Tailings)	1,403	5
Meyer & Charlton G. M. Co., Ld.	422	1
Salisbury G. M. Co., Ld.	315	0
Robinson G. M. Co., Ld.	1,038	18
Ferreira G. M. Co., Ld.	215	4
Black Reef Syndicate	210	1
Langlaagte Estate & G. M. Co., Ld., (Tailings)	2,328	0
" " " (Concentrates)	420	0
New Primrose G. M. Co., Ld.	2,433	18
Orion Syndicate	1,104	9
Chemis Syndicate	510	14
Village Main Reef Co., Ld.	125	4
Randfontenl Estate Gold Mines, Ld.	605	18
Treasury Tailings Syndicate	419	8
La Fortuna Syndicate (Stanhope Tailings)	458	14
Durban Roodepoort G. M. Co., Ld.	2,509	0
Jubilee Gold Co., Ld.	358	14
Walker Long (Evelyn Tailings)	215	5
Rand Central Ore Reduction Co., Ld.	1,334	7
Henry Nourse G. M. Co., Ld.	525	13
City and Suburban G. M. Co., Ld.	400	7
New Heriot G. M. Co., Ld.	1,051	19
Tribute G. M. Co., Ld.	812	4
Stanhope G. M. Co., Ld.	245	9
Ravenscraig Syndicate	314	10
Totals	24,004	4

With such an experience as this to cite, it is useless for people in other gold-producing regions to say "there is nothing in the cyanide process." There may be nothing in it if not worked properly, but when systematically operated on a large scale, as in South Africa, the results show it to he a most valuable metallurgical process.

Gold Properties on Stock Boards.

At a meeting of the executive committee of the San Francisco Stock Exchange on Wednesday, a resolution was adopted suspending for 30 days the rule requiring the payment of $500 for the privilege of listing gold mines on the Exchange. They will only be called upon to pay the $100 annual dues. It was also resolved to have a circular printed giving all information upon this subject and to send a copy to every gold-mining company and gold-mine owner upon the Pacific Coast. As we recently stated in an article on the subject of mining stocks, there are no gold mines listed on the Stock Boards except a few of the Bodies. The transactions are almost entirely in silver mining stocks. There is little or no business in them in these days, and the brokers have heen having even harder times than the rest of the community. This new plan is intended to bring in a new line of stocks to he dealt in. Gold mines are in demand just now and perhaps would make good lines of speculation. The Pacific Stock Exchange a year ago offered extra indncements for gold properties to he listed, bnt very few have taken advantage of the offer. It remains to he seen how that of the San Francisco Board will result. There has always heen less chance for speculation in gold mines than in silver. Notwithstanding our many mining-stock excitements, the owners of gold properties have held aloof and have not listed their mines. Whether they will do so now is a question. The stocks of more or less gold-mining companies change hands at private sale, but usually in "blocks." They are not quoted on the markets, and only those directly interested know much of their value. Gold-mining here is generally carried on as a legitimate business operation, and the speculative feature was years ago eliminated. It may he just at this time, and under the peculiar circumstances existing, gold-mining companies will list their stocks and permit them to he speculated in. We do not anticipate,

however, any great rush to accept the offer of the Stock Exchange, on the pert of these companies. Most of the gold mines ere conducted as private business operations, and the ways of Pine street have not generally been of much benefit to such mines as heve been dealt in, whetever has been the result to the "operators" and managers.

Auriferous Gravel Channels.

In his article on the "Ancient River Beds of the Forest Hill Divide," Mr. Ross E. Browne gives the courses and gredes of various patches of channel exposed in mining, but seys that the information in rather meeger. As to the origin of the quartz gravel, be says: The enormous accumulation of quertz gravel in the white channel of the Mountain Gate and Hidden Treasure mines is a matter of some interest. A lerge number of the smoothly washed bowlders are from three to six feet in diameter, and weigh from one to ten tons eech. One of the lergest encountered had a smoothly washed surfece and was between ten and twelve feet in diameter, weighing over fifty tons. It does not eppeer likely thet the heavier of these moved very far after reaching the rough bottom of the river bed, and the surfaces were probably polished by the sherp quertz sand in the swift current. Still the great mass of the meterial was doubtless derived from a source far above these sections.

In extracting the gravel and exposing the channel bottom there have been fonnd a number of large quartz ledges. One of these measured thirty-four feet in width. Still the amount of quartz thus seen in the bedrock does not appear as sufficient to account for the filling of the channel. One is led to assume that the size of the quartz ledges, or their number, farther up stream and perhaps nearer to the original surface, was greater than in the bedrock now exposed in the channel bottom.

Bench Gravel.—Numerous benches on the rims of the larger channels have been worked with profit. Owing, however, to the uncertainty regarding the extent of such benches when buried under the volcanic cap, there has been very little prospecting for them in the principal drift mines.

High up on the west rim of the piesent El Dorado canyon ere a number of benches which have been hydraulicked with profit. The Batchelder, Franklin, Drummond, and El Dorado Hill deposits are doubtless more recent than the ancient channels under the volcanic cap. The gravel of the Gas Hill and Big Gun pits is practically the same as that of the Mountain Gate and Hidden Treasure white channel—there is good reason for thinking that these are remaining patches of the same channel deposit.

In this connection attention is called to the "Review and General Discussion" of Mr. W. A. Goodyear, pp. 488 to 526 of Whitney's "Auriferous Gravels." Mr. Goodyear's foresight in outlining the courses of certain channels, at that time (1871) but imperfectly developed, is noteworthy. He indicated approximately the course of the Mountain Gate white channel several years before the discovery of the Hidden Treasure, and pointed out the probability of the bend in the Paragon channel many years before the Mayflower discovery was made.

Depth of Gravel.—The depth of bedrock gravel wholly under the volcanic cap is, as a rule, from thirty to one hundred and seventy-five feet in the channels of the first period, and from a few inches to twelve or fifteen feet in the channels of the second period.

Width of Channels.—The character of the bedrock seems to have had an important influence on the width of the channel, the course and the psy. The old river was frequently narrowed down and turned by contact with belts of the harder metamorphic rocks. The accompanying plan of the Red Point mine is a good illustration of the effect of the hardness of the bedrock upon the width of the channel and the amount of gravel deposited. The black surface represents the amount of gravel extracted, and practically the entire extent of gravel in the channel hottom. Where the channel crossed the hard reef, it was narrow and contained no gravel, the volcanic cement resting immediately on the bedrock. (See page 65.)

The Gold.—In the Blue Point the greater part of the gold is of medium size or fine and flet or scaly. The gold from the blue channel of the Mountain Gate mine and from the Paragon and Mayflower channel is about the same as that from the Red Point. That from the white channel of the Mountain Gate and Hidden Treasure and from the Weske is somewhat coarser. Nuggets weighing one to two ounces are not uncommon; they seldom weigh as much as 10 or 15 ounces. The distribution of the gold in the gravel is not always the same, though, as a rule, the bottom layer of gravel is the richeet.

The fact is frequently commented upon that the quartz ledges in this district, though numerous, are usually too poor to pay the expense of working. This does not necesearily justify the conclusion that they were too poor to furnish the gold in the chennels. Some of the ledges have ehown gold enough to induce the investment of capital, and have at times paid a profit. It would not appear as over-sanguine to expect $2 or $3 per ton in a bottom layer of concentrates, representing a very smell frection of the mass of quartz broken and grounil slniced.

Finely lamineted slates with quartz seams form good riffles in the channel bottom for the lodgment of the gold. The gold nuggets and scales frequently become embedded in the softer slates to such an extent that it pays to remove the bedrock to a depth of several inches, or even a foot.

The effect of the swiftness of the current upon the pey is important. An underloaded current, *i. e.*, a current charged with less detritus than it is well able to carry, is ept to cut its bed and prevent the accumulation of gravel. A greetly overloaded current will deposit too rapidly to admit of the concentration of the gold dust. It is apperent, therefore, that a suitable relation between the velocity of the current and the amount of material carried is an importent fector in forming a streak of pey gravel. If such a relation exists, and is undisturbed for a considerable period of time, and the material passing over the riffled bed cerried sufficient gold, a rich body of pay gravel may be formed.

An increase of grade, or nerrowing of the channel, will cause an increase of velocity, and the same stream may be nnderloaded in a narrow, steep section, and overloaded in a broad, flat eection. Furthermore, a stream may be underloaded in the center of the channel and overloaded on the rims; or it may be underloaded on the outer rim of a curve and overloaded on the inner rim.

Other conditions being the same, when the average grade of the channel is very great, one should expect to find the pay in the broad, flat sections, on the rims, and high up on the inner rim of the bend; when the average grade is very small, rich gravel will be more likely to occur in the sections where the current is relatively swift.

In the Forest Hill district, where the average grades range from 60 to 80 feet to the mile, the general experience in working the bottom leads seems to be about as follows:

In the larger channels of the first period, the best pay pay is found on the brow of the steeper pitches on the down-stream course and on the inner rims of a bend. The pay generally favors one rim for long stretches. Near and at the foot of steep pitches and in very narrow sections there occur potholes and the deposit is barren, consisting of round bowlders and sand. In the channels of the second period there is a scarcity of gravel in the narrower sections, hence the broad, flat sections are preferred, even though the gravel may not be so rich.

The upper pay leads, such as the upper lead of the Paragon, probably represent long periods of comparative equilibrium between cutting and filling, while the poor strata are more likely to represent periods of rapid filling. A lack of stability in the beds of the upper strata militates against the frequent occurrence of rich pay leads in them.

Fig. 13 presents the average cross-section of the Mayflower channel, the plan and longitudinel section, or profile, of the bodies of pay gravel extracted (in hlack), and the plain or rim contours ten feet above the channel bottom. There are further given, in small figures, the total amount of gold extracted from the various sections and the average yield in dollars per ton of gravel (ranging from $3 to $5) at intervals of 100 feet. The average grade of the Mayflower channel is 12 feet in 1000.

THE successor to Geo. W. Starr, who resigned the superintency of the original Empire Mining Oo. of Grass Valley to go to South Africa, is Mr. Robert Walker, who has been assistant superintendent and book-keeper of the Empire mine for the pest five years and a half. He thoroughly understands the workings of the mine, is a good maneger, and will give satisfaction to the company. Chas. Stocks, the foreman selected, is one of the best-known mining men in Grass Valley district. He is familiar with the underground workings of the mine, and will continue to make the Empire yield handsomely.

D. N. OOFFIN has resigned from the superintendency of the W. Y. O. D. mine of Grass Valley to give all his time to the development of the Green Mountain mine, in which he is a large stockholder. W. H. Shockley has besn appointed his successor by the W. Y. O. D. people. For 12½ years Mr. Shockley was superintendent of the Mount Diablo mine at Oandelaria, Nev., which is now closed down owing to the decline in silver.

THE Excelsior mine at Smartsville is getting ready to build new reservoirs, etc., to prepare for hydraulicking. They will shortly present a petition to the California Debris Commission for a licenee to mine.

Coast Indnstrial Notes.

THE railroad company is rapidly collecting the timbers for the great bridge that is to be built between Secramento and Washington.

NEW rich placer mines have been discovered on one of the tributery streams on the Yukon river, a few hundred miles below Forty-mile Creek.

THE Pacific Underground Electric Railway Company was incorporated Tuesday. Directors—J. J. Scrivener, F. S. Ohedbourne, John F. Burgin, A. Oraig end D. B. Richerds. Capital stock $100,000.

ARTICLES OF INCORPORATION have been filed on behalf of the Shasta Canal and Irrigation Company; capital $100,000. Directors—Oharles Rickoff, A. A. Hebbard, William Crum, B. A. Cutter and S. G. Pettis.

THE Sierra Grevel Mining Company was incorporeted Monday. Directors—C. H. Whitten, W. H. Beetty Jr., Joel Mason, Jemes E. Berry and Albert Hoogs. Capitel stock $125,000, of which $5100 has been subscribed.

THE Plecerville Water Works Compeny has incorporated with a fully subscribed capital stock of $120,000. The directors for the first yeer are: Eliza Baum, Rudolph Beum, Alexander Baum, John Peat and Gustav Dresel.

NAVAL CONSTRUCTOR TAYLOR, at Mare Islend Navy Yard, has completed plans and specifications for a new tugboat for the nevy yard. The plens and specificetions will be forwarded to the Navy Department at Washington for approval.

THE record of the Columbia river salmon fisheries up to date has never shown such a disastrous year as the present, and the fishermen are unanimous in declaring that the trap contrivances are responsible for the shortege. Up to last Saturday the total catch for the whole river hes been 185,610 cases, not half of last year's pack.

THE Western Manufacturing Company, 114 Mission street, has shipped to the North Star mill a monster steam road-wagon for hauling lumber. It is similar to the one made by this firm for Richardson brothers, of Truckee, which has been in use for three years, hauling 50,000 feet of lumber to the load and saving $1.50 per thousend.

THE closing down of the silver mines, smelters, redncetion works, coal mines, railways and factories has put the laboring classes of Oolorado in a deplorable condition. It is estimated that 10,000 men are idle in Denver and 20,000 in outside towns. Soup-houses are being established for hungry people, and other means taken to help the needy.

THE San Antonio Water Company has decided to issue bonds for $350,000 for the improvement of the irrigation system of Ontario and to purchase additional water. The vote stood: For bonds, 4606 shares; against, 97 shares. The purpose is to increase the water supply to an inch to five acres. Several propositions have been made to the directors of the company to take the bonds for water.

THE Superior Court has dissolved the injunction forbidding the Bear Valley Irrigation Company from extending the canal across the land claimed by Alice Marlette. Both sides had men with shotguns on the ground for some weeks to guard their interests. The new canal extends from the Santa Ana river to Alessandro, 20 miles, costing $250,000. The decision is a victory for the company and very important to the region about Redlands, Sen Bernardino connty.

J. W. KIMBLE, one of the proprietors of the great tinplate manufacturing plant of W. & G. Taylor Co., Philadelphia, was in this city this week. He said: "We have used at times considerable of your San Bernardino tin, but we found that it, as well as other American tin, cost us three cents a pound more than imported. We couldn't stand that very well, so most of the block tin now used comes from abroad, some from Australia. All our machinery, however, and everything else we use, directly or indirectly, is of American manufacture."

AT Ohino last year, which was the third year since the beet-sugar business was entered upon, there was produced more sugar than on the largest plantation in the South. The product consisted of 8,000,000 pounds. There are now about 6000 acres of beets growing there, and four years ago the land now devoted to beets consisted of part of an open ranch, for which there was no special use. Three years ego, too, when the factory began operations, there was very few people there. Now there are about 1500. This shows how rapidly a beet factory will gather workers around it.

A LONG-PENDING DEAL between the Jamul and Mount Tecarte Water Companies, San Diego county, was concluded last week. The Mount Tecarte Company gives the Jamul irrigation district water in exchange for reservoir sites. This means the almost immediate construction of one of the greatest irrigation systems in the State. The two reservoirs have a capacity of 25,000,000,000 gallons. Over one hundred thousand acres are to be irrigated. Mr. Pope of San Francisco, one of the interested parties, says the work will begin inside of 90 days, and, as preliminary, a line of railroad will be built to Dulzura, 40 miles east.

ARTICLES OF INCORPORATION of the Southern California Development Oompany were filed with the County Clerk of San Bernardino county last week. The directors are A. P. Willoughby of New York, B. O. Johnson, R. E. Archer and C. E. Fish of Redlands, and B. W. Brown of Moreno. The principal place of business will be at San Bernardino. The capital stock is $15,000,000. The objects of the corporation are to acquire water and water rights, develop and sell power for manufacturing purposes and carry on an agricultural and manufacturing business.

THE sealing vessels from San Francisco, Victoria and other Pacific ports have had a lucky season thus far. From traders on the Aleutian islands and along the coast on the way up, Commander Ludlow and his assistants learned that nearly 80,000 skins had already been secured by the hundred-odd sailing craft engaged in this work during the present year. The skippers, however, claim

to have taken nearly 60,000 of these in Japanese waters, while another 6000 recently consigned to British Columbia, it is alleged, were captured on the Russian coast, and leaving 12,000 for the Alaskan coast and Behring sea, it is largest catch at this early period reported for several years. How many of these skins were taken in Behring aea can only be estimated. The 6000 skins delivered in British Columbia sold at $14 per skin, an unusually high price.

THE financial stringency throughout the country is affecting the manufacturing industries of Napa. Owiog to the lack of demand for its product the Manufacturers' Woolen Mill has heen compelled to reduce its force, and as soon as the present stock of raw material is worked up, which will he about the 1st of next month, the mill will shut down entirely until the times improve, thus throwing out of employment about 50 persons. At the Sawyer Tanning Company's works the force in the finishing department is heing reduced. Other departments of the tannery are not affected, and there will he no reduction of the working force, except in the department named. McBain's tannery is still running with the usual force, hut it is intended to shut down as soon as the present stock on hand is worked off, which will he in about two weeks. There are rumors that the Corlett planing mill will he temporarily closed and that the Main tannery may shut down until hetter times come. If so, 400 persons, many of them heads of families, will he thrown out of employment.

FOR the construction of a jetty at the entrance of San Diego hay, hids have heen put in at the office of the Government engineers in this city. The bids include trestle per lineal foot, mattress in place per cuhic yard, stone per 2240 pouods, and office huilding. The hids suhmitted for the aggregate of these items are as follows: S. R. Smith, $31.82; W. Jacohson, $36 81; Healy & Tibbitts, $41.70; H. G. Easton, $43.61; J. G. Quinlan, $43.91; A A. Polhemus, $49.10; D. Landen, $51.72; J. P. Phillips, $58.50. The length of the jetty has not been decided upon, as the appropriation on hand only amounts to $85,000, and about $10,000 of this sum will he consumed in defraying the expenses of the Government's representatives who will he in charge of the work. In width, however, the jetty will measure 32 feet over all, and a double-track, standard-gauge railroad will be constructed on the trestle work. The crest of the jetty will he at the level of the mid-tide, with sides sloping in such manner as hest to resist the action of the waves. On the line of the jetty the low water depths vary from 1 to 11 feet, the average being from 3 to 5 feet. The maximum depth of over 15 feet is found in certain places. The jetty will revet the shore line at the extremity of Coronado North island, and, when finished, will act as a breakwater to the eutrance to the hay where steamers have at present to take such a devious course in order to avoid shoals. The rock to he used in the work cannot be procured from any point nearer than the Sweetwater quarry, which is 24 miles distant, or from Waterman's quarry on the Cuyamaca road, nearly 26 miles distant. The hrush, too, will be hrought as great a distance, while most of the lumher will he carried down from San Francisco. Work will commence within 30 days from the date of the contract heing awarded, and must, under the terms of the contract, he completed within nine months.

Trip of University Students to the Mines.

TO THE EDITOR :—I wish to publicly express through you my thanks to some of the mining men of Amador and Calaveras counties for the many courtesies extended to my students and myself in a trip which has just heen concluded through these counties. The Amador County Miners' Association kindly volunteered to meet all the expenses of the party while in their county. This hospitahle treatment was very much appreciated, although the hoys preferred to pay their own way. We are under very great ohligations for kind offices to almost every one we met, hut I must mention in particular Mr. A. B. Call of the Gover, Mr. Hale of the Keystone, Mr. Myer of the Bunker Hill, Senator Voorhies and Mr. Downs of Sutter Creek, Mr. J. F. Parks of the Kennedy, Mr. Detert of the Zeila, Col. Alvinza Hayward and Mr. Charles Lane and his son of the Utica, and Mr. Frates of Ione City. To all of these and many others I am much indehted for what has proved a very interesting and profitahle trip to hoth students and myself.

Your readers will he interested to know that Col. Hayward is going to give the "cyanide process" a trial on a workiog scale on some of the extremely fioe sulphurets that result from the "hlanket plant." These are so fine that it is difficult to roast them without mechanical loss. Vacuum filtration after treatment in an agitator will he used. The results will be watched with great interest.

I agree with you as to the necessity of calling attention to the value of gold-mining to California. I was reading an old copy of J. Ross Browne's Resources West of the Rocky Mountains for 1868, when I came across the following, p. 65: "*Utica.*—The Utica, 600 feet long, is owned in San Francisco. There was a nine-stamp mill which did not pay, and has been moved away. The deepest workiogs are 60 feet from the surface."

This was the condition of affairs when Charlie Lane and Col. Hayward took hold of it. Every one knows the result. Is it not a pity that there are not more capitalists who are willing to risk a little in developing the resources of the State?. Very sincerely yours,

Berkeley, July 22, 1893. SAMUEL B. CHRISTY.

San Bernardino County Camps.

TO THE EDITOR :—At Vanderbilt the sale of the Gnld Bronze mine to J. B. Haggin has heen effected and possession given. J. L. Flood visited his St. George property this week. President Lyle is now huying pumping machinery with which to drain the mine and permit sinking. The Hongkong mine, the property of A. A. Banning, is showing some fine ore. J. L. Rohinson, one of the owners of the Richmond, left for Chicago Monday. W. H. Smith is making a shipment from the Murray. John Kreiner brought in some rich ore from Soda lake. Its value is about equally divided between silver and gold. Several prospecting parties have gone to a district five miles south of Crescent, found hy Metcalfe and Dooley. It promises well, large veins hearing gold in a free state showing prominently. A fine gold strike was recently made oo the north side of Campbell mountain. The Nevada Southern railroad is laying track and will be within two miles of Vanderbilt by August 10th.

In the Crescent district, W. A. Phelps is stoping a carload of $200 gold ore for shipment. A contract has been let to sink the Spaulding silver mine 50 feet deeper. The three-foot ore hody now showing averages 150 ounces. Work will start this week on the properties recently bought by Los Angeles parties and under the management of Al Stevens. Harvey Forester has made a free gold discovery on the north side of the mountains that excels anything yet found in the district. A concentrator will be needed very shortly, and water is being developed for that purpose. A peculiarity of this district is the rich silver float found in several places, while the ledges which furnished it have never been discovered. Not much attention is being paid to silver properties, the miners devoting their time to seeking the gold ledges which show over so extended a section. M.

Vanderhilt, July 22, 1893.

Pocket Mining.

NUMBER IV.

Free or Decomposed Pockets.

TO THE EDITOR :—The ore found in free or decomposed pockets is of a magnetic nature, or, in other words, each separate particle of the gold has a slight affinity for the other. In order to prove this, it is only necessary to take the flour gold from one of these pockets and corner it dowu in a pan until it forms a string of an inch or so in length in the crease of the pan; then take considerahle more water into the pan and by a sudden jerk movement try to scatter the flour gold hy the action of the water carrying it over the hottom of the pan. No matter how fine your gold may be, you will find, try whatever way you may, that you cannot completely distribute and separate the particles of gold. You can always see it with the naked eye, and, if you will take a small magnifying glass and examine the bottom of the pan, you will find that the particles of gold lie in hunches or clusters and not completely scattered, each particle laying separate hy itself.

The flour gold from a milling vein, or, in other words, from a vein or ledge that carries an equal amount of gold all along, when treated in this manoer will completely separate, and it will he found hy examining the hottom of the pan closely with the glass that each particle will he seen lying hy itself and not gathered in clusters or hunches the same as the pocket gold. This proves that the particles of this class of pocket gold have an affinity or attraction for each other which causes them to hunch together. All of the minerals found in the pocket in a metallic or solid form have the same attraction or affinity which the gold has, and all of them play an active part in concentrating the gold and forming the pocket.

There may he several other minerals found in this class of pockets, hut a pocket without *lime*, *iron*, *copper*, *lead* and *sulphur* has not yet heen found. They are always present in free or decomposed pockets. They may not always occur in the same form, hut they are generally in either a chloride or metallic state. These five minerals are the key to the pocket and are what cause the pocket to form. Of course gold is included and makes the sixth mineral. Should *any one* of these minerals be lacking, besides the gold, in a ledge and the ledge or seam that comes in contact with the ledge proper, there will he no pocket found, or at least there never has been a pocket found without this comhlnation of minerals. Several other minerals may he found in pockets hesides those five above named, hut they do not play an important part in forming the pocket. Wherever this comhination of these five minerals is found in a ledge, and there is any gold, there is generally a pocket on the ledge, although, either from some curious action of nature or from the peculiar action of some other foreign mineral upon this comhination of five, it sometimes occurs that no pocket forms even when those five necessary minerals are present, hut this seldom happens.

Those free or decomposed pockets invariably occur near the surface, for this reason: The necessary minerals required to form the pocket, if not already contained In the ledge, must he carried there or drawn to that point hy those in the ledge, and as most minerals are deposited by solution near or on the surface, consequently they concentrate and "pocket" near the surface.

It is nearly always safe to count on finding a pocket on a ledge near the surface where those five minerals exist at ooe point, no matter in what form they may occur so long as they are there. The size of the pocket can very often be determined by the size of the ledge proper. A large ledge nearly always gives a large pocket, while small ledges and seams do not appear to have the body to support a large deposit of those minerals, consequently the pockets are small. The rim, ledge or seam which comes in contact with the ledge proper, at the point where the pocket occurs, is as essential to forming the pocket as the combination of the fire minerals; and in every pocket yet found, of this class, this contacting seam or ledge has always heen found. It appears to be the feeder through which the minerals are carried to the pockets, although sometimes the pocket occurs on this feeder instead of the ledge. Those cases occur oftener where the ledge is harren quartz than where the ledge is more mineralized. The first step that the prospector should take, who intends to follow this hranch of mining, is to make a study of those five minerals, so that he can readily detect them in any form; and when he has acquired that knowledge he then has the main key tn finding this class of pocket. I have known men whn were so expert at detecting, with their eyes, those minerals and the different indications of a pocket, that, after a close examination of the ground, they would walk directly to the spot and mark the place on top of the ground where the pocket was, and upon digging down, the pockets were found directly underneath the spot they had marked.

ALEX QUARTZ.

Hydraulic Mining.

We clip the following from the Bakersfield *Californian*. It is worth reading, for it shows how a hright editor was converted to the cause of hydraulic mining:

The Colusa *Sun* does not like what the *Californian* said ahout the resumption of hydraulic mining, and sneers at our sources of information, suggesting that our statements were founded on hearsay.

Not so. The editor of the *Californian*, so long as his sole source of information was the press, was as ardent an opponent of hydraulic mining as is the editor of the *Sun*. But there came an opportunity for him to visit the hydraulic mining region, some three or four years ago, and he improved it. He spent months traveling through the mining counties. He saw the principal mines, talked with miners, merchants and farmers—yes, farmers, the very farmers who are supposed to have lost so heavily through the operations of the mines. He visited, too, the valleys nf the Feather, Yuba and Sacramento rivers, where so much damage is said to have been done, and, after all this, he read the reports of the government engineers, appointed to examine into all the details of the question.

When he had done this, he returned to San Francisco a thoroughly converted man, so far as regards his previously formed ideas on hydraulic mining.

The farmers, the merchants—every class of people from nne end of the mining region to the other—were found of one accord in their accounts of the loss caused by the suspension of mining, and in their hopes that it might he resumed. Yea, also, many farmers in the valley were found whn complained that their hest market had heen destroyed hy the destruction of the mining industry.

Further than this, fine farms, alfalfa fields, orchards and vineyards were pointed out, which were growlng upon no other than a foundation of slickens, in places where the dehris had heen impounded, and lands once washed out in mining had heen replaced with detritus from other mines higher up.

What the *Californian* said as to the amount of capital invested in hydraulic mines and rendered of no value through Judge Sawyer's decision, was not founded on "San Francisco newspaper statements" any more than were the figures of the annual production of gold, or the total damage caused hy the hydraulic mines. Those figures are all taken, as the *Sun* well knows but will not acknowledge, from unimpeachable and unprejudiced sources. They are supported hy too much authentic evidence to he denied upon the mere dictum of any San Francisco or even Colusa newspaper.

What we have said, we maintain—that the resumption of hydraulic mining means renewed prosperity for all the towns of the foothill belt, now suffering from dry rot, and not for them alone, hut for the cities and farmers of the valleys, whence was once drawn the hulk of the vast amount of supplies consumed annually in the mines.

London Rules Silver Prices.

The N. Y. *Post's* Washington correspondent says: So much criticism has been passed upon the policy of the Treasury in determining the price which it would pay for silver hullion, and so many questions have been raised as to whether the London market or the New York market should he used as a basis, that it was suggested to-day to Mr. Preston, Acting Director of the Miot, the wisdom of explaining clearly to the public the theory upon which the Treasury was proceeding.

"I claim," said Preston, "that in accordance with the law the price of silver in the London market must necessarily he taken into account. It is the price of silver there that regulates the price of silver the world over. The London rate has regulated it all through this century and regulates it now. The London rates controlled the commercial value of silver even when the mints of the Latin Union were open to the unrestricted coinage of silver at a ratio of 15½ to 1.

"The French colnage ratio had no effect after the closing of the mints of the Latin Union to the unrestricted coinage of silver. Ask the bankers of Paris, Melbourne, Calcutta or Hongkong the price of silver, and before answering he will consult the latest London quotations. The English market being so largely supplied hy the United States, we should naturally expect to find silver cheaper in the United States than in London, and when we do not so fiod it we cannot help inquiring the cause. It is because the Treasury is hound to follow the law. If those charged with making the purchases of silver for the Treasury did not endeavor to ascertain whether the price offered agreed with the market price, and if in that endeavor they did not compare the prices offered with the price in London, the world's silver market, they would be derelict in their duty.

"American holders of silver bullion are well aware of the importance of London silver quotations. I find this passage in the London *Economist* of July 8th: 'It would appear now as if American producers were interested in keeping up the London price of silver, as that practically governs the price at which the United States Treasury must huy its quota of 4 500,000 ounces per month. They have heen manipulating this market, which, as it holds no large stock of metal, is comparatively easily influenced.' Now, if the London market is not to be considered in this matter, as some critics of the Treasury claim, why should any one on our side of the water have felt interested in influencing it?"

The Hillock and Mound Formations of Southern California.

Daniel Cleveland, of San Diego, Cal., writes as follows to *Science:*

Some time ago, in an article upon the nest of the trap-door spider, which appeared in *Science*, I mentioned the low mounds in which these nests in many districts are so often located, as being in themselves an interesting formation. I now propose to offer an explanation of the origin of the formation.

Let me begin by saying that these mounds are not confined to this vicinity, for they extend throughout this State and elsewhere on this coast and in Texas; but they are more numerous and better defined here than elsewhere; they are, in fact, a characteristic of certain large areas in our territory. For this reason, among others, I believe this to be the best field for observing and investigating this remarkable formation.

Lying just back of the commercial portion of the city of San Diego there is a great mesa or table-land, which stretches away for a distance of from eight to ten miles to the valleys at the base of the Coast Range. It possesses a rich brown soil, holding in many places considerable aggregations of loose stones which have drifted down from the neighboring mountains and been ground into pebbles. Here for miles the surface is gently undulating, with low mounds lying as close together and as numerous, considering their size, as the ground will permit. These mounds are from one to three feet in height above their bases, and are from ten to thirty feet in diameter, separated by greatly varying areas which in their depressions in many places contain accumulations of cobble stones. An unscientific person seeing these plains for the first time might imagine that they had once been densely populated by large burrowing animals which had left these hillocks to mark their subterranean dwellings.

Several theories have been advanced to account for this formation. The most probable hypothesis is suggested by the nature of the soil and the peculiar vegetation of these plains. The soil itself is dry and hard for the six or eight months constituting the rainless season. During the time of heavy rains it is soft and mellow. During the time of drought it becomes almost as hard as stone.

Each mound, it is evident enough, marks the former home of a shrub or, as was almost always the case, of a cluster of shrubbery, to whose agency the mound in a large degree owed its existence. Three shrubs—*Rhus laurina*, Nutt.; *Simmondsia California*, Nutt.; and *Isomeris arborea*, Nutt.—are conspicuous among the large vegetation of these plains, and have been very important factors in the formation of these mounds. Of these plants *Rhus laurina* is the largest and much more abundant than the other two. It is an interesting fact that these three shrubs are confined to this section of California, mostly to this county, and that they were all first collected at San Diego about 1840, and were named by the eccentric naturalist Thomas Nuttall. He established the genera *Simmondsia* and *Isomeris*. The habits of these plants peculiarly fit them for their office of mound builders. They grow in small compact groups. Many stems rise from the roots, which are large and spreading. The foliage of *Rhus* and *Simmondsia* especially is dense and falls close to the ground.

Dust blown by the steady trade winds of the dry season is arrested by the shrub and accumulates with the fallen leaves at its base, making a steady accretion of material. In this way a mound gradually rises about the plant, in time covering the lower branches and in the case of the smaller shrubs — *Simmondsia* and *Isomeris* — nearly or quite enveloping the whole plant. This process of mound building can still be seen in isolated hillocks. An examination of the older mounds confirms this theory. In the older portion of the mound the earth is compact and indurated, while the surface soil is light loam mixed with decayed and decaying leaves. The mound is protected from washing by the rains at the summit by the overhanging branches and foliage, and at the base by a compact mass of roots. Outside of the foliage and roots the process of erosion goes on steadily, though slowly, during the rainy season, when this soil is peculiarly susceptible to the action of water, and the hollows between the mounds are then formed.

When in the course of time the plant dies from natural decay, from being smothered by the drift that environs it or from the fires that sometimes sweep over these plains, the mounds, being deprived of protection, are attacked by wind and rain and gradually worn down. The mounds are thus made shallower and broader at the base, until from this steady subsidence they sink down and flatten out almost to the general level of the plain.

The presence of living shrubs upon the most perfect mounds and of masses of roots well preserved or in process of decay in mounds in subsidence, where no large growing vegetation has been seen for many years, and in the oldest and flattest mounds the disappearance of all traces of shrubs and roots, confirm our theory of mound formation and subsidence.

What the shrubs I have named—*Rhus*, *Simmondsia* and *Isomeris*—have effected in co-operation with the wind and rain in the formation of mounds in this section, has been accomplished elsewhere by other shrubs and trees. It is a familiar fact that upon the great prairies of Texas mats of timber are generally found upon the summit of hillocks, very much larger, of course, than the mounds of southern California, as those trees are larger than our shrubs.

HAULING LOGS IN THE REDWOOD REGION OF THE UPPER COAST OF CALIFORNIA.

Value of the Varying Grades of Coal.

Recently a test of two days duration was made at the Richard Borden Mills at Fall River, Mass., to find out if a saving could be effected by changing the kind of coal used under their boilers. A standard grade of coal was used, but the test showed very clearly that all good coals are not equally economical. In this particular case it was found that, pound for pound, one coal would evaporate ten per cent more water than the other. That means one coal gave ten per cent more power, or, to show it more clearly as being a matter of dollars and cents, ten tons of the one coal did the same amount of work as eleven tons of the other. The comment of *Power* is that there is an important point for every manufacturer using steam power, and when two standard grades of coal show as large a difference as this, what would a test show were a poor grade of coal compared with a good coal. The result given above is almost startling when a little figuring is done. Merely assuming that the poorer grade cost $3.00 per ton, the better coal would be cheaper by five cents a ton if offered at $3.25. If one salesman could have offered these two coals to his trade, saying that one coal would cost $3.00 a ton and the other $3.25 a ton, would not 99 out of 100 have taken the coal costing $3.00 a ton? The man buying the coal would have figured on saving just 25 cents a ton on all the coal he would use, while as a matter of fact his coal bills for a year would amount to more than had he taken the coal costing $3.25 a ton. Without carrying this any further, is it not very evident that this matter of saving in the cost of power is worth looking into? There are many different qualities of coal. Every one wants the best, but it is safe to say that all are not getting it. There are cases without number where it would be money in pocket to figure out the coal bills for a period of three to six months, and make a change in the source of coal supply and see how the coal bills for an equal period would compare with the original. The actual amounts spent in such periods are often so large that even a small percentage represents a considerable saving.

In the Redwoods.

Such scenes as that upon this page can now be seen at various points in the great lumbering counties of our upper coast region. It represents the movement of a train of logs from the slopes upon which they grew, either to the sawmills below or to the railways which run to the mills from various points accessible over a working grade. After the trees have been felled and cut into proper lengths, the logs are hauled by oxen to the landings on sides of the railway tracks where they are placed upon cars for transportation to the mills. In some localities where there are no railroads the skids run direct to the mills, but this is impracticable for long distances. At most of the places on the northern coast the mills are at the mouths of the rivers and the logging is carried on some miles back from the coast. The skid roads are then used to haul the logs to the trains. These skid roads are made of small logs or limbs placed a foot or two apart. Along the center of the top a rounding groove is soon worn on which the log lies. This grooved part of the skid is usually greased with some cheap lubricant so that the log will slide easily.

Of course these skid roads are down hill, the trees being cut on the ridges and sides of the canyons and dragged over the skids to the railroad at a low point. All the way from three to a dozen or more logs are hauled in a string, being connected by chains. These skid roads may be seen extending in all directions in the timber which is being worked up. On the steep hillsides they are not used as the logs move too freely and can be hauled down more easily on the bare ground. In some places it is not necessary to use lubricants and in others men go ahead with buckets and dippers wetting the skids. In the picture the train has evidently been stopped at the base of a steep grade for the convenience of the photographer.

THE MAGNETIC POLE.—No one knows, and therefore no one can explain, the precise reason why a magnetized needle does point to that mysterious spot on the coast of Bothia Felix; and, strange as it may seem, there was in 1831 no visible trace of anything by which that spot could be recognized, not even so much as a small hillock in the immediate neighborhood, and the only means of proving that the magnetic hill had been reached was by the total inactivity of the compass at that spot, coupled with the almost vertical position of the dipping needle, says a writer in the *Cornhill Magazine*. On this most interesting point the very words of Sir James Ross himself shall be given: "The amount of dip as indicated by my dipping needle was 89° 59′, being thus within one minute of the vertical; while the proximity at least of this pole, if not its actual existence where we stood, was further confirmed by the action, or rather by the total inaction, of the several horizontal needles then in my possession. These were suspended in the most delicate manner possible, but there was not one which showed the slightest effort to move from the position in which it was placed, a fact which even the most moderately informed of readers must now know to be one which proves the center of attraction lies at a very small horizontal distance, if at any

Preventing Gold Robberies from Mills.

A "retired gold miner" writes to the London *Mining Journal* giving the result of Australian experience on the detection and prevention of one of the evils of the gold-mining industry. The letter will be of interest to gold miners in other regions and is herewith reproduced:

From the accounts to hand it is evident this evil of robbery from gold-mills has attained serious dimensions, and I consider it incumbent on the part of practical men of experience in mill management to volunteer any information they may possess that can be of service to help to checkmate the villainy, not only in common honesty to the shareholders that are being plundered, but in the interest of society generally; hence my letter. If you think the record of my experience may be of some service, I request you will afford it space in your valuable journal.

No one that has not experienced the evil of gold-thieving from reduction mills can have any idea of the pernicious element it is, and the difficulty, once that it has got "well hold," of rooting it out. It permeates every class of society in the district connected with the industry, and managers, amalgamators, assayers, accountants, aye, even bank officials, are "all on the job" to "get a bit" while there is an opportunity. To exterminate the hateful monster requires on the part of the mine proprietors combined stern and drastic measures undertaken under the personal supervision of one or more of their directors, and in many instances necessitating the removal of the whole of the official staff. The disinclination of the Transvaal Volksraad to assist in exterminating the evil by legislation increases the difficulty; in fact, it is equivalent to putting a premium on dishonesty and affording protection to the thieves and receivers of the stolen gold.

In Australia no bank or mint will purchase retorted or bar gold, unless it is satisfactorily declared from whence it was obtained, and in event of a purchase being declined notice is given to the police, with the result that the party will be closely watched. This has given rise to a common saying among millmen that there is only one thing more difficult to do than to steal gold from a mill, and that is to convert it into coin after it is stolen. But it is not so in the Transvaal, consequently mine proprietors must protect their own property, and after 23 years practical experience in mining and milling I contend that it is an impossibility for amalgam (in any quantity) to be stolen from a properly-conducted mill, except through either the negligence, incompetence or collusion of the mine and mill officials. I could enumerate a number of instances of amalgam thieving that have come under my observation, and in all cases resulting from one of the above causes, therefore the remedy is in reorganizing the staff so as to eliminate from it all germs that might possibly produce them.

In 1877 a friend and myself were asked to buy a one-fourth share in a private mine in Australia. There were 40 head stamps, plenty of free-milling quartz to keep them going steadily, yielding from 10 to 12 dwts. per ton, and had paid 20 per cent for the past three or four years to the shareholders, who were perfectly satisfied and contented. My partner and I, both practical gold miners and millmen, went down and examined the mine in such a manner that, to use a homely phrase, we "turned it inside out," and there was not a spot of it we did not prospect with the mortar and pan, a mode of procedure that we could not fail to observe was much resented by the mine manager, and we came to the conclusion there was something wrong somewhere, and after waiting to see the battery cleaned up with a return of 9 dwts. 17 grains per ton for the fortnight's running, which the mill manager observed was the poorest they had had for a long time, we remarked that we did not think it good enough, and there was no mistaking the expression of relief in the countenances of those two men when we made the latter remark and bade them good-bye. The poorest prospect we had got at all was equal to nearly 8 dwts. to the ton, and we had any amount that ranged between 15 and 25 dwts. per ton. We concluded that at the least it ought to mill 16 to 17 dwts. per ton, and it was in consequence of this that we so exhaustively prospected it, and finally came to the conclusion that either the mill mortars were not tight and amalgam was escaping into the foundations or there was systematic thieving going on, and we inclined to the latter. By adroit negotiation we succeeded in buying within a month five-eighths of the whole property, and then we again visited it. The general manager, we were convinced, was as honest as the day, but he had no practical knowledge of milling, and neither had he of prospecting with the pan and mortar. The latter can only be acquired by years of experience, and I would consider a man incompetent to be a mill manager who could not by pan-prospecting with certainty estimate to within 2 or 3 dwts. to the ton what ore would yield through the mill, ranging say from one-half ounce to one and a half ounces per ton.

We first of all dispensed with the services of the general manager, and then issued the following instructions to the mine and mill managers, I remaining at the mine to see them carried out until I substituted a practical local man as agent, who afterwards carried on the work most efficiently:

(*a*) Both of those officials to keep separate books and accounts; in other words, to be distinct departments.

(*b*) The ore formerly was all thrown together and put through the mill; I subdivided it into four classes, A, B, C and D, representing deep levels north and upper levels north, deep levels south and upper levels south, and allotted to each class in heads of stamps at the mill.

(*c*) The mine manager to try three prospects, forenoon and afternoon of each day, from the dumps of each of the four classes, and record in a book to be kept for that purpose the estimated mill yield of each one.

(*d*) The mill manager was required to do the same at the mill and keep his record.

(*e*) There were four underground bosses in each shift, 12 in all, I had a hook fixed at the top of the shaft in which I required each of these men, at the expiry of every shift, to record any change in the faces of the quartz and particularly in regard to quality.

(*f*) Having divided the ore into four classes I instructed the amalgamators, of which there are two in each shift, six in all, that I required the amalgam from each to be kept separate with the object of ascertaining what each part of the mine produced.

(*g*) I procured padlocks for the covering boards of the mercury tables and gave the keys to the amalgamators with instructions that they were not to hand them over to any one except the exchange shift without my written authority, and instructed them that they should clean down the plates every three hours, and after cleaning down the amalgam buckets to be placed in the cleaning-room, which I instructed to be kept locked and the key in charge of a watchman night and day.

(*h*) The whole of the amalgam taken from the plates during each 24 hours to be cleaned and squeezed by the two amalgamators on duty every forenoon at 9 o'clock in the presence of the mill manager, who should weigh each lot, and enter it in a book to be kept for the purpose, and the entry to be signed by the mill manager and both amalgamators as witnesses.

(*i*) Every alternate Friday the mortars to be cleaned out; the work to be commenced punctually at 8 A. M. by the six amalgamators in the presence of the mill manager, assisted by the three amalgam cleaning-room watchmen and the four battery feeders on duty, prohibiting any of them from leaving until the cleaning-up was finished, and the amalgam cleaned, squeezed and weighed, and the amount entered by the mill manager in the record book and attested by the amalgamators.

I think the intelligent reader (particularly those with a knowledge of the business) will see the drift of the above regulations, viz., for there to be any peculation the whole of the battery staff—14 in all—would have to participate in it, and the number was too many to keep a secret. Formerly the amalgam cleaning-room was sacred to the mill manager, and on announcing to that official the new instructions, he at once tendered his resignation in a tone of offended dignity, immediately followed by that of the mine manager. It is a significant fact that shortly afterwards these two officials purchased a large mill and other property at a cost of over £10,000, and that the mine yielded for the following three years during which I was connected with it, an average of over 17 dwts. to the ton, as against formerly 10 to 12 dwts.

The reader must draw his own conclusions. I used to make it a practice to visit the mine daily and prospect the ore, and having the mine and mill managers' daily prospecting as a guide as well as my own, every man at the mill knew it was impossible for them to thieve without my detecting it; moreover, I made it a rule to discharge any of the mill employes that I discovered were interested in any small private claims.

The crux of the whole thing is having the practical miner at the head of affairs, and it is impossible for him to thieve if the work is carried out in the manner I have described.

Working Aluminium

Aluminium can be easily melted in ordinary fire-clay crucibles, without becoming brittle or taking up silicon, provided that no flux is used, and that the temperature does not exceed its melting point. The cohesion of the aluminium particles amongst themselves is much greater than their adhesion to the material of the crucible. Any addition of flux will bring about a contact, and then the absorption of silicon commences at once.

Aluminium may also be melted without harm in iron crucibles, if the necessary care be taken with regard to the temperature. At a dark red heat no alloying of aluminium with iron takes place, and even if taking place, the alloy containing iron has such a high melting-point that it sticks to the sides of the crucible. In this way some aluminium may pass over to the crucible, but no iron can be taken up by the metal.

Notwithstanding this, the greatest care is recommended in using fire-clay or iron crucibles, especially with unskilled laborers, because the least carelessness or error in judging the right temperature may turn the best material into a second-class metal, unfit to be used for certain purposes.

It is, therefore, under all circumstances, advisable to line the crucible with charcoal, or a mixture of any indifferent oxide mixed with tar. Such crucibles, in all sizes, may be got from the Neuhausen Company. If properly covered when in use they will keep several months and may be used without any extra precaution being necessary.

If the melting be carried out in a closed hearth furnace, we are advised that care must be taken that no pieces of coke fall into the crucible at the time fresh fuel is supplied.

Large quantities of aluminium are, we are informed, says a writer in *Invention*, melted in reverberatory furnaces, and in these cases also the hearths should be lined with indifferent oxides, and for the fuel, wood or gas should be used. The cleanest way is obviously to melt it by electricity, but this is only practicable in those works which can efficiently dispose of an electric current.

The heat of fusion should reach a dark red only. Notwithstanding its low melting-point, aluminium requires much time and heat for this process, in consequence of its high specific and latent heat of fusion previously referred to.

If objects cast in sand are required to have the color of silver, they should not, we are told, be cast at an intense red heat, otherwise they will turn out a very poor color.

Whilst other slowly-softening metals, like copper or malleable iron, are very pasty in the molten state, the contrary is the case with aluminium. It is a valuable property of the metal that it does not need, like other metals, to be heated far above its melting-point to become fluid. As long as the temperature, when casting, does not exceed a dark red, there is no fear of the aluminium combining with the sand of the mold.

As regards the molds, the heavy shrinkage of aluminium must be taken into consideration. Thick parts should be connected with large heads to give a broad cut-off surface.

There is no fear, we are assured, of pure aluminium, when being cast, taking up any impurities in the way of oxide scum, as is the case with aluminium bronze.

Castings in chills need a higher temperature than those made in sand, and the molds should always be previously well warmed.

Before casting, we are instructed that the mass should be well stirred with a charcoal stick, skimmed with a carbon plate, and finally well blown off.

The loss in remelting compact pieces appears to be no heavier, but rather less, than with other metals. It varies, we are told, from 2.6 per cent, according to the size of the pieces. Turnings and shavings lose on an average 10.15 per cent, and fine dust up to 60 per cent. It is said that the most advantageous way to remelt small quantities of waste aluminium is to make them first up into the form of bricks, to pump the air out of them, and to suck in light oils which leave but little ash.

Refuse from castings and ashes are ground in a crushing mill; small quantities pulverized in a mortar, and then sifted. The metallic parts are pressed flat during the milling operation, and will remain in the sieve whilst the earthen parts pass through in the form of powder.

The forging of aluminium will be successful if the metal is always kept near the annealing temperature, which shall never exceed 450 degrees C. Articles which should be very hard must be forged cold. With reference to this, the forging, rolling and pressing in the cold state will, we learn, be accepted as the best manner in general, as the fact must not be lost sight of that aluminium forged or rolled hot has very little strength, and is very soft, the same as cast aluminium; whilst cold worked it will reach the strength of phospbor bronze, besides possessing a certain hardness and elasticity.

It will also be understood that before forging all defects originating from the casting will have to be cut or planed off, otherwise cracks during the forging will occur. Aluminium containing silicon and iron cannot, we are told, be forged.

Metal of similar quality to that above mentioned can be rolled very easily, like gold or silver. Tin, although very soft, we are informed, can in no way compete with aluminium in this respect. The fact that leaf-silver has been totally driven out of the market, and replaced by leaf-aluminium, we are reminded, speaks for its great malleability more effectually than any words could do.

To put the metal into a form suitable for the operation of rolling, it is first cast in molds into large blocks, cleaned from any impurities, and divided with a cutting machine. Any rings or marks arising from the cutting must be taken off by filing, planing, or grinding. The blocks prepared in this manner are put into a muffle furnace, and brought to a temperature similar to that for forging. On the blooming and middle roll the metal should always be rolled hot; afterwards it can be rolled cold. Any sheets which may have become hard and springy during the operation, need only a slight annealing for the last turn if required to be soft.

Changes in the General Game Law.

Attorney Deering of the Fish and Game Commissioners, in answer to a question relative to the changes which have been made in the general game law of California by the supervisors of the interior counties, gave the following list of alterations in the open seasons, which will prove decidedly interesting to sportsmen in general:

Under the general law of the State the killing of game and the catching of fish are allowed only during the following seasons, viz.: Deer from September 1 to October 15; quail from September 1 to March 1; doves from August 1 to March 1; ducks from September 1 to March 1; trout, from April 1 to Nov. 1.

The above open seasons have, however, been changed in some of the counties by local ordinances, and in such counties the local law prevails. The counties which have up to the present made changes in the general law are as follows:

Deer—August 15 to October 1, Colusa; July 1 to December 15, Humboldt; July 15 to September 1, Los Angeles; July 15 to August 15, Marin; September 15 to December 1, Nevada; July 15 to September 1, San Mateo; July 15 to November 1, Shasta; September 1 to November 15, Siskiyou; July 22 to September 4, Sonoma; July 15 to October 15, Tehama; July 15 to September 15, Ventura; August 15 to October 1, Glenn.

Although the supervisors of the above counties made the foregoing changes in the general deer law, yet, owing to the lateness in advertising, the seasons will not open in Marin county until July 24, in San Mateo county until July 25, in Shasta county until August 1, and in Los Angeles county until July 29.

Quail—September 10 to March 1, Humboldt; October 1 to February 1, Marin; August 1 to March 1, Napa; October 1 to March 1, Nevada; September 15 to March 1, Placer; September 15 to March 1, San Mateo; September 1 to February 1, Siskiyou; October 1 to March 1, Yuba; October 1 to March 15, El Dorado.

Doves—July 1 to March 1, Colusa; June 15 to March 1, Contra Costa; June 1 to January 1, Humboldt; August 1 to January 1, Marin; July 1 to March 1, Monterey; July 1 to March 1, Nevada; July 1 to January 1, Placer; July 25 to December 1, San Mateo; June 25 to January 1, Shasta; July 15 to January 1, Sutter; July 1 to January 1, Tehama; July 1 to March 1, Yuba.

Duck—Attorney Deering said that very few changes have been made in the State laws by the county boards and they are as follows: Monterey, from August 1 to March 1; San Diego, September 1 to May 15; Yuba, September 15 to March 15.

In Ventura county the shooting of quail, doves and wild ducks for market is prohibited at all seasons.

In Yuba the hunting and trapping of pheasants is prohibited, and in Glenn county the killing of Mongolian pheasants and fishing for black bass is prohibited.

It was stated that the Supervisors of Mendocino county had ordained at a recent meeting that it will be unlawful to shoot deer in Mendocino county until July, 1895. This report has not yet been verified, however.

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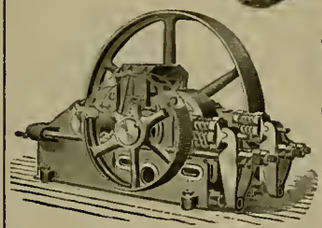

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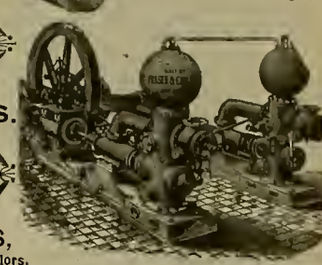

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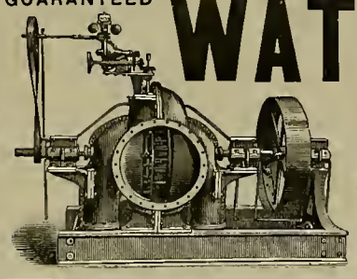

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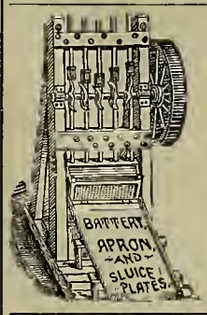

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Mechanical Progress.

Firebox Steel.

The subject of the quality and inspection of steel for fireboxes was discussed at the recent convention of the American Master Mechanics' Association. The following brief paper was presented by Mr. William McIntosh, Division Master Mechanic of the Chicago & Northwestern R. R., at a recent meeting of the Northwest Railway Club:

The expense of renewing firebox sheets is so great that railway companies can afford to pay much more for this steel than they are now paying if by so doing they can procure material that will give longer service. The value of the steel sheets used in repairing and constructing fireboxes represents but a small part of the cost of such repairs and renewals. I estimate not more than 10 per cent. On the one hand, we have the cost of material and on the other we have the labor that is required in this work, the expense of tearing down machinery that otherwise would not have to be disturbed, and the loss of service of the engine, which, for the time required to put in a new firebox, would average not less than six weeks or 45 days and amount to $360, on a conservative estimate of $8 per day as the value of such service. This item alone aggregates several times the value of the steel needed for the new box. It is therefore obvious that if it were possible to procure a better quality of steel, even at double the price we are now paying, which would render one-half longer service, it would be wisdom to get it. This does not admit of discussion.

The questions now arise: Where are we going to obtain this good steel? Is it in the market? Can it be manufactured? My knowledge of the manufacture is limited, and I will not undertake to do more than say that I think such a quality of steel can be procured at the figures now quoted or even at a less cost. The quality of firebox steel has either deteriorated during the past ten years or the conditions of service have so radically changed that it is destroyed much quicker. I draw these conclusions from observations during that period, and as an illustration I will say that I have taken out fireboxes within the past few years that had been in service from eight to ten years, and I have recently removed firehoxes that have been in service but four years. I have also renewed sheets that were in service but one year. The firebox that gave ten year's service was crucible steel, and the sheets that lasted but one year were from the open-hearth furnace. Whether the latter process allows the raw material of an inferior quality to be introduced I am not prepared to say positively, but I think it does. That only the best of material is used in the former process goes without question. Whether the open-hearth process can produce a better quality of steel by taking the same quality of metal to commence with that the crucible method uses, is a question that steel-makers can best determine. The subject is one well worth investigating, as there is a wide margin of economy outlined in this proposition. Complaints are general throughout the western country about the unsatisfactory service obtained from firebox sheets, and it is my opinion that if some enterprising manufacturer produces a superior quality of steel he will find plenty of purchasers for it.

The Economy of Special Tools.

The modern processes of manufacture have been reduced in many cases by sheer financial necessity to such systematic arrangement as to make possible the production of a multitude of articles far within their cost by the older methods. The milling machine, the turret lathe and the screw machine are daily turning out by hundreds what the lathe and planer can only make by tens. And yet the relative economy of these new tools is to the greatest degree dependent upon the number of pieces to be made. It is the wise man who knows when, and when not, to prepare special tools, jigs and templates, so that, notwithstanding their increased first cost, his completed article may be more cheaply made. Likewise, the minute division of labor, that makes of every workman a specialist and an expert, is warranted only by multiplicity of similar pieces and operations. In the manufacture of watches, for instance, this is carried out to a degree that would have opened wide the eyes of a manufacturer 25 years ago. At the World's Fair, in the exhibit of the American Watch Company, is displayed a specially designed continuous lathe, so ingenious in its construction and so accurately timed in its movements, that the piece fed in at one end is clamped in a chuck operated upon by a single tool, released at just the instant when an automatic finger has grasped it, is swung around to another chuck, dropped by the finger as soon as caught by the chuck, operated upon by another special tool, and then sent along on its journey to successive tools in the same general machine. This masterpiece of machine design doubtless effects a saving in the cost of the finished pieces that pays a handsome interest upon its first cost, and yet what economy could there be in the use of a similar, but stronger, machine in the ordinary machine shop. Surely the end must justify the means, and one of the first principles in the introduction of such a machine must be to determine its interest account per piece made, and add this to the actual cost of the piece, in deciding upon the economy of its use. A machine for ordinary manufacture that cannot be almost continuously employed must show marked economy in its operations to prove a financial success. Nevertheless, when the articles made are great in numbers, the skill acquired by the workman who performs only a single operation, and the perfection of result with reduction of time attained by the special tool, render the entire process systematic, decrease the cost and improve the quality of the completed piece.—Iron Age.

A Slag Steam Generator.

Several attempts have been made in this country to contrive some practical method of utilizing the waste heat contained in the furnace slag for the production of steam for motive power purposes. An Australian paper states that the problem has been solved by two gentlemen who have an apparatus at work on a slag dump in the Broken Hill district. The machine consists of a steel shell in the form of a strong egg-ended receiver, having flattened faces on the top and bottom. Through these flat portions a number of Galloway tubes, arranged in two rows, and which are tapered from five inches at the top to ten inches at the bottom, are passed, and secured to the shell by flanges. The lower or larger end of each tube is closed by means of a cast-iron door, which is manipulated by means of a convenient lever. The upper end of each tube is provided with a funnel for convenience in pouring the slag into the tubes, and a pair of iron rails pass across the upper face of the boiler and all the funnels, and thus serve as a track for the slag pots. At each end of the boiler a bin is provided, into which is dumped the skin of the slag, which always sets on the cast-iron pots from which it is poured, and this red-hot material lying against the ends of the boiler plates serves to conserve the heat at the same time, and impart additional heat to the water.

The *modus operandi* is as follows: The boiler being filled with water to the required level, the slag is poured into the tubes at one time, just as it comes from the furnaces. As soon as the tubes—which are 24 in number in the machine now at work—are full, the first tube filled is emptied by merely releasing the lever which controls the door, and a conical cast of cool slag drops into the truck below, which is provided for its reception. The operation is continued with the various tubes, and as soon as the truck is loaded it is conveyed to the edge of the dump by means of a horse or some other convenient power and tipped over. As the tubes are emptied they are refilled with molten slag, and in this manner the work is conducted continuously. At the conclusion of a 72-hour test the boiler was emptied, and the tubes and all portions of it were carefully examined, it being a moot point in the opinion of some as to whether the slag would have deteriorating action on the tubes. The most minute examination failed to detect the slightest action of any description, so the boiler was filled and subjected to a hydraulic test of 180 pounds to the square inch, an ordeal which it withstood perfectly.

POWER FROM NIAGARA FALLS.—Announcement has been made within the past few days that quite a number of manufacturing enterprises scattered through Pennsylvania and New York will move their plants in order to secure power from the Niagara Falls Power Company. This great enterprise of utilizing the water power at Niagara falls and transmitting it electrically to points some miles distant has been pushed almost to completion. Few, if any, undertakings of the kind have ever been more carefully begun or more vigorously carried forward. The company has taken a great number of contracts to furnish power for different plants beginning September 1st. While various sections of the country will suffer the loss of plants projected or already in operation, as many such will be removed to points near the falls, the country as a whole will be proud of the enterprise.

Scientific Progress.

The Antarctic Whaling Expedition.

As many of our readers are doubtless aware, a whaling expedition comprising four ships—the Balæna, the Diana, the Active and the Polar Star—left Dundee in September last to try their fortunes among the whales and seals of the Antarctic ocean. Their destination was the region visited by Ross in his third Antarctic voyage in the years 1842–43; and the prime object of search the southern right whale (*Balæna australis*). Seeing how rarely the Antarctic regions are visited, and how imperfect is still our knowledge of their geography and natural history, it was arranged that the medical and some of the other officers of the expedition should endeavor to make observations and collect specimens so far as the exigencies of their other duties permitted.

The expedition has now returned safe and sound, and one of its members has contributed a preliminary account of its doings to the *Times*, from which we take the following summary:

It appears, indeed, that while much important information has been acquired as to the meteorology of the Antarctic, and some additions made to geographical science, the general scientific results are not so satisfactory as was hoped would have been the case; this being mainly due to the time of all persons on board being fully occupied in capturing and flensing seals, during the period when the vessels were in the most interesting regions. During a short stay in the Falklands, the officers learned that the Antarctic fox is becoming well-nigh extinct; while Darwin's prophecy that the wild horses and cattle would eventually be replaced by the more remunerative sheep is being rapidly fulfilled. Moreover, through incessant pursuit, the fur-seal, although still found, is comparatively rare.

The first iceberg was sighted in Lat. 59° 18′, and the same day (December 16th) Cape petrels and other members of the same order were met with in shoals, while the seas were found to be absolutely swarming with various species of finner whales. Soon after, the first seal was descried and promptly dispatched; the species is not identified, although it is stated to be one of those first discovered by Ross. On the 22d, flocks of sheathbills were met with, while, on the next day, the presence of the lovely white petrel and the olive color of the water indicated the proximity of the pack ice.

Although no right whales were sighted, a large number of seals, of various kinds, were taken, and by the middle of February the vessel in which the *Times'* correspondent sailed had secured its full quota. Three different kinds of seals were taken, which are described as the "large seal," the "white Antarctic seal" and the leopard seal. The species of the last is, of course, certain, while the second would appear to be the crab-eating *Lobodon carcinophaga*, and the first is probably Widdel's seal (*Leptonychotes weddeli*). Besides these, it is stated that the party came across a fourth kind of seal, described as of large size, with a small head, small flippers, thick blubber, and a rather woolly pellage.

Formation of Coal.

Nature is still making coal, though, unfortunately, not at a rate anything like fast enough to make up for the consumption of this product. The processes may be watched from beginning to end. For this purpose one must first go to a peat bed, which is simply an accumulation of the remains of plants that grew and decayed on the spot where they are now found. When the upper layer of this material is removed one finds peat with 52 to 66 per cent of carbon, and the deeper one goes the better in quality it gets. It may be cut out in blocks with sharp spades, the water may be pressed from the blocks, and they may be stacked up, covered and dried and used for fuel. There is a certain kind of moss, called "sphagnum," which in large part makes up the peat-producing vegetation. Its roots die annually, but from the living top new roots are set out each year. The workmen who dig peat understand that if this surface is destroyed the growth of the bed must stop; so commonly they remove the sod carefully, replacing it after they have taken out a stratum of peat. There is little doubt that if these beds of peat could lie undisturbed and covered over through many ages they would take on all the characteristics of mineral coal. The substance of coal has been so compressed that the forms of the plants composing it cannot usually be seen. But when a piece of it is made so thin that it will transmit light, and is then subjected to a powerful microscope, its vegetable structure may readily be distinguished. Immediately under every separate seam of coal there is a stratum of what is known as fire-clay. This stratum is always present, and contains in great abundance the fossil impressions of roots and stems and twigs, showing that it was once the soil from which vegetation grew luxuriantly. It is common, also, to find fossil tree stems lying mashed flat between the layers of black slate which form the roofs of coal mines, as well as impressions of the leaves, nuts and seeds which fell from these trees while they were living. In some beds of cannel coal whole trees have been found with roots, branches, leaves and seeds complete, and all converted into the same quality of coal as that by which they were surrounded. Geologists are of the opinion that bituminous and anthracite coals were formed during the same period and under like conditions. Originally they were all bituminous, but during the violent contortions and upheavals of the earth's crust at the close of the carboniferous age the bituminous coals involved in that disturbance were changed by heat and pressure and the consequent expulsion of volatile matter from bituminous to anthracite. Cannel coal is a variety of bituminous which burns with great freedom, the flame of it affording considerable light. It was called "candle coal" by the English people who first used it, as it often served as a substitute for candles. The name became corrupted to "cannel" and has so remained. It is more compact than ordinary bituminous coal and it can be wrought in a lathe and polished.—Black Diamond.

Scientific Education Invaluable.

Information concerning the positions that graduates of scientific schools obtain is readily gained by consulting the lists of graduates usually given, with their occupations, in catalogues of the best institutions. To generalize, a scientific school of good reputation feels, in granting a diploma to a student of marked ability, that it places to his credit a fund equivalent to not less than $10,000. This statement will doubtless be readily understood, if the instance he assumed of two young men of equal ability, one of whom graduates with honor from a scientific school at the age of 22 years, while the other engages in business with no assistance except his own energy and intelligence, which is true in a large majority of instances. Within four years after graduation the young man from the scientific school will receive an annual compensation of at least $1500.

The young man in business will meet with more than the average of success if at the end of four years he receives $3 per day for services, unless he is located in New York or Chicago. Independently, then, of the great satisfaction which any educated person derives from his attainments and the greater enjoyment of the best interests of life, which can only be appreciated by a cultivated mind, the young man who adopts a profession within three years after graduation receives an annual income of six per cent on $10,000 the difference between the annual salary and that of the young man in business. At the end of ten years those who studied faithfully while at the scientific school are receiving from $4000 to $8000 or $10,000 a year from their salaries alone, while men of equal original abilities are doing well if they can earn over $3000 without imperiling capital of their own.

THE *Electrical Review* of London notes that "the dome of the main lobby in the new building of the German Imperial Diet is being equipped with what is claimed to be the largest corona existing." The diameter of this corona is stated to be 26 feet, and it is being fitted with 12 arc and 250 incandescent lamps. The supposition that it is the largest corona in existence, however, is an error, for any one of the five great electric-light coronas in the manufactures building at the World's Fair is much larger. There are five of these coronas, and they light a space about 1300 feet long and 368 feet wide, inclosed by great steel trusses which extend to a height of 202 feet above the floor. The coronas are suspended by wire ropes at a distance of 140 feet from the floor. The larger is in the center and has a diameter of 75 feet, supporting 102 arc lamps; the others are each 60 feet in diameter, carrying 78 lamps. The lights, which hang in two concentric circles, number 414 in all.

ALUMINIUM IN MINES.—According to the *Moniteur Industriel*, the engineers of the principal coal mines of the Nord, in France, are studying the application of aluminium to the manufacture of cages, cables, etc.

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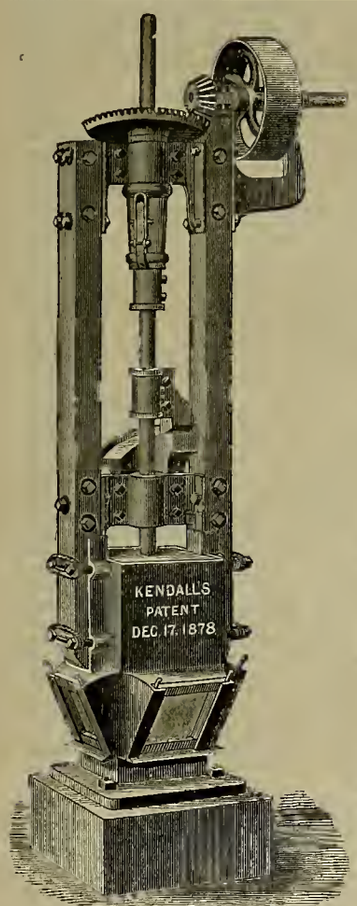

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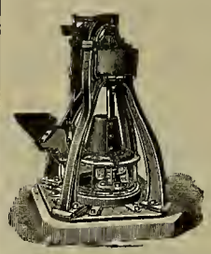

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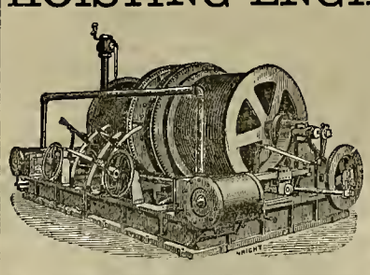

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Electricity.

Heating by Electricity.

In a long article in the *Manufacturer*, Mr. Campbell Scott says:

Such a quantity of electricity is necessary in operating electric railway systems that the loss of a small portion of it is hut a minor item to electric railway managers, and from the start they showed an eagerness to adopt any method possessing so many conveniences as electricity for heating their cars and making them comfortahle and attractive to their passengers. At the present time at least one-fourth of the electric railways of this country have their cars heated hy electricity, and from what I can learn a very satisfactory result is accomplished at hut a very slight cost.

The method employed is very simple, which is as follows: Underneath the seat of the cars, in three or four locations therein, one of these electric heaters is placed and a small portion of the electric current used in operating the motors of the cars is diverted through the heaters. The general method employed in this new form of heating device for heating cars is as follows: The frame of the heater is generally about eight or ten inches high, ahout six inches thick and about three feet long. A special "plaster" ls made, looking something like porcelain, when hard, in which very fine, especially prepared wires are embedded from one end to the other in zigzag fashion. The entire surface of the plaster is in this way embedded with the resistance wire, with the two ends of the wire protruding at one end, while in some cases several plates of plaster with these wires embedded therein are employed, after which the plaster substance is applied to the exposed surface of the wire, thoroughly encasing them therein. After this has heen done, the whole suhstance ls cooked until it resembles the hardest porcelain, with enamel finish. The exterior metal case, with legs underneath, is placed around this, and with sundry finishing touches we have an electric stove or heater. It must be understood first, before I describe the method by which the heat is produced through the abovementioned medium, that electricity always flows in what is technically known as a "circuit," *i. e.*, the electric current, after being developed from a generating source, must return to the same source. In other words, electricity will not flow or operate unless this circuit is maintained, for as soon as the circuit is hroken the flow ceases. Any metal will conduct electricity to a greater or less extent, but some metals possess the capacity of conveying a given amount of electric current with a far less loss than others. When we attempt to convey electricity through a bad conductor, we seem to "cramp" the electric current, and it seems that a great friction takes place thereln, which causes heat. In other words, when an electrical conductor retards the passage of the current the conductor is heated and the greater the resistance offered by the conductor to the passage of the current, the greater is the intensity of the heat prnduced. Copper is considered one of the best conductors and offers but little resistance to the flow of the electric current, while such metals as platinum, German silver, etc., are termed poor conductors, and on this account offer great resistance to the current's passage, and consequently, in them, the current produces heat. In electric heaters above described, very poor results would be obtained if the wires employed therein were composed of copper, which offers a very low resistance to the passage of the current, while the best results are obtained from the use of fine, especially prepared wire, which offers a very high resistance to the current's passage and consequently causes the production of heat. This special resistance wire being embedded in the plaster is practically protected from the outside air, and a very high heat is produced, which is conveyed to the enamel, the intensity of heat being governed by the quantity of this resistance wire employed, also by the quantity of current which flows through it. For several years a number of inventors have been at work endeavoring to so perfect this system of heating that it will be available for many of the commercial and domestic uses where small heated surfaces are necessary.

Hydraulics Versus Electricity.

As the electric crane recently completed at Southampton is the first of its kind erected in this country, its performance will be watched by many with conslderable interest. Hydraulic cranes have for some time retained the supremacy for all shipping work, and have proved themselves very efficient and reliable, having also the advantage of great simplicity. The principal disadvantages, however, of hydraulic cranes are the heavy loss of "head" in the main due to friction, the liability to freezing ln cold weather, and the fact that the power used is nearly the same for light loads as for heavy ones. A comparison, however, as to the relative cost of working each system is hardly possihle at the present time, hut we believe that the commercial efficiency of good electromotors is quite equal to that of hydraulic motors, if not superior, at equal loads, whilst the gain ln operating light lifts must be considerably in favor of electricity. Considerable economy is effected in first cost of mains and in the loss of head or voltage due to long distance transmission; also for work of a very intermittent character, and when there is an electricity supply company within reasonahle distance there is this great advantage, that the cost of the generatlng station is not laid directly on the consumer, and the lahor, expenditure and capital cost is thereby much reduced. We helieve there is a considerable field for the new-comers, and should the working cost compare favorably after due trial, hydraulic crane makers will have to look to their laurels. The Southampton Harbor Board are to be congratulated on the liheral and go-ahead policy they are adopting. We are of opinion that the time is not far distant when electrically-operated cranes for many purposes, in which other powers have hitherto heen used, will be the rule rather than the exception.—Industries and Iron (London).

The Electric Fans.

"What a world of comfort electric fans foretell." Non-owners of electric fans, can you imagine what this little device can do for you, what a privilege it is to sit durlng the hottest kind of a "sizzard" with the windows closed down tight to shut out the heat, in the delightful breeze caused by an electric fan? Think of the delicious enjoyment, almnst touched, we might think, wlth a little feeling of superiority over the sweltering multitude as they pant on in thelr respective paths of duty. You smile audibly to yourself as you watch some particularly perspiring individual, generally of the kind who might say wlth Hamlet, "Oh, would that this too solid flesh would melt!" He madly rushes to catch a street-car when another follows at a distance of a few feet.

Then you moralize a little and hegin to believe that you are really better off than somebody else. Dog days do make people so pessimistic. Every one knows you can't help it. General Humidity is blamed, and rightly, too. But you, dear reader, if you are the fortunate possessor of an electric fan, may rise above the surging multitude and look down upon them in your snperior wlsdom, for you become wiser when you own one. This has become an established fact. Charles Lamb in all his glory could not do justice to the electric fan.

Think what an alleviator of suffering it may be. Oh, yes, it has its pathetlc side also. Let us go hack, for a little while, to a period 30 years ago. There were no electrlc fans in those days. Let us select a particular incident, a most pathetic one.

On the top floor of a house, not too well supplied with the luxuries of life, tossing on a bed of pain, lies a little sufferer. Beads of perspiration are seen upon her forehead. It is the middle of summer. The heat is intense. Patiently at the side of the bed sits the mother, and not for an instant does she relax the regular motion of her arm as she fans the child. Now she changes the palmetto leaf to the other hand; the lahored breathings of the one in pain are heard, and the waving and rustling of the fan is the only sound which seems to penetrate the thick, heat-laden air. The observer wonders when she will tire. Never, unless exhaustion overtakes her, for she is a mother, and it is her offspring for whom she is laboring. It is, indeed, labor of the most tiring kind.

What a difference there would be were the fan-motor to take her place. Think of the grateful breeze cooling the fevered brow of its merry hum. One can almost lmagine oneself at the most fashionable summer resort with a ten-dollar-a-day sea breeze whistling merrily through his waving locks. Oh! it is glorlous. Buy a fan. Shut your eyes and see for yourself.—Electrical Review.

TURPIN, the inventor of melinite, has submitted to the French War Office an electric gun alleged to be capable of discharging 25,000 projectlles in five minutes, and to have a range of several miles. The apparatus is comparatively light in weight, so that it can be drawn by two horses and worked by four men. The projectiles are small shells charged with a secret chemical preparation, spreading death for 60 yards around. The English Government is said to he negotiating for the purchase of the invention, though skeptical of its value.

Useful Information.

Sweets Are Healthful.

If the English philosopher, Herhert Spencer, desired to make himself solid with the rising generation he could hardly have done it more surely than by commending sugar and candy as healthful foods, especially for the young. Children have always a strong liking for candy, and they almost always dislike fat. Older people, who have learned to eat fat meats, do not have the relish for sweets that children have. Mr. Spencer thinks that the instinctive liking for candy and sweets satisfies a need of the system. Large amounts of carhon are needed to maintain animal heat. Old people get this in starchy food. Children live largely on milk. This, except for the fat it contains, is not heat-producing. So if you want to keep children healthy give them small amounts of candy or sugar daily. The uncolored candies are least likely to be injurious.

Injury, of course, is possihle from overfeeding with candy as with everything else, but if given in small amounts every day sugar and candy are aids to digestion and will promote the general health. The notion that sugar and candy are unhealthful dates from the time when everything that was healthful was deemed evil. It is a relic of asceticism, and possibly reinforced by the consideration that sweets were unnaturally dear, and it is a thrifty thought to vote them unsafe to eat.

Since sugar has become much cheaper, its use in all forms has largely increased. If children are given sweets while young they will be less likely to have lung diseases and be ohliged to take cod liver oil when they they grow older. The cod liver oil is nearly pure carbon. That is why it fattens. But so too is sugar, and the carhon in that is in much pleasanter form to take.

It is important to unlearn our unfounded prejudices. That against sugar has been one of the most persistent. It does not do older people harm to do without sugar. They get carhon in other forms of food. But with children the pleasant taste of sweets increases the flow of saliva and helps digestion of everything that is eaten. The fact is well known by farmers in localities where sugar is made, that all who engage in its manufacture grow fat and sleek during the busiest season and when they are working the hardest. It is quite possible that this fact has had some relation to Herbert Spencer's theory on the subject. Mr. Spencer is one of the modern school of philosophers who find facts first and construct theories to harmonize with them. That is much better than the reversal of this process. The old cry that sugar was unhealthful has been unchallenged too long, especially as no facts were ever adduced in support.

Great Fairs of the World.

The first great International Exposition was held at London in 1851. It lasted 144 days. The buildings and grounds covered 21 acres; there were 17,000 exhihitors and 6,039,195 visitors, 41,933 daily. The receipts were $2,530,000 and the expenses $1,460,000.

In 1855 the second World's Fair was held at Paris. It continued 200 days, and covered 24½ acres. There were 21,779 exhibitors and 5,162,330 visitors, 25,811 a day. The cost is conjecturally stated at $1,700,000; the receipts were $1,280,000.

The third exposition was held in London in 1862. It continued 171 days, and covered 23½ acres of ground. There were 28,653 exhihitors and 6,211,103 visitors, a daily average of 36,325. It cost $2,300,000, and the receipts were $2,040,000.

The fourth was in Paris in 1867. It covered 37 acres aod continued 217 days. The exhibitors numbered 50,236, and the visitors 10,200,000, 47,470 daily. The cost was $4,000,000, the receipts were $2,100,000.

The fifth great World's Fair was in Vienna in 1873. The buildings covered 40 acres, and were occupied by 42,000 exhibitors. There were 7,254,687 admissions during 186 days, an average of 39,003 per day. The cost was $11,000,000; the receipts were $1,030,000.

The Philadelphia Exposition of 1876 was the sixth great display. The buildings covered 60 acres; there were 60,000 exhihitors, and 9,910,996 admissions, a daily average of 62,323. The cost is stated at $8,500,000; the receipts are said to have been $3,800,000.

The seventh International Fair was in Paris in 1878. The buildings covered 60 acres, and the exhihitors numbered 32,000. There were 13,000,000 admissions during 194 days, a daily average of 67,010. The official report makes no mention of cost or expenses, though it is believed the enterprise did not pay.

The eighth fair was at Paris in 1889. The huildings covered 75 acres, and were occupied hy 60,000 exhibitors. The exposition remained open 183 days, and was attended hy the astouoding numher of 32,354,111, a daily average of 181,170. The cost was $11,000,000; the receipts were $8,380,000.

Protean Uses of Petroleum.

Petroleum enters into a greater number of commercial products than any raw material, not excepting the cocoanut palm, which, as the Chinese say, has a good use for every day in the month. Petroleum can do better than that. The uses of crude petroleum hy actual count can he set down at 180; that would be a use for every day for six months. This astonishing result is due simply to the nature and chemical composition of the oll. Petroleum is protean.

Few people have any correct idea how petroleum enters into the manufacture of articles used to satisfy man's daily needs and comforts. How many people in Eastern cities that eat Western dressed beef know that petroleum was used in the cold-storage machine whlch preserved the meat? How many ladies ruhbing their faces or their hands with vaseline or "cold cream" have ever given a thought to the various processes through which petroleum must pass ere it is sold by the corner druggist?

How many travelers on the railway think that both the machinery of the locomotive and the delicate works of their watches are kept in running order by petroleum? How many boys and girls would chew gum if they knew they were chewing petroleum? How many invalids have an idea that their medlcine contains petroleum, or that the liniment or ointment which cures their pains and aches is petroleum? How many housekeepers, who burn petroleum in gasolne stoves, think there is petroleum in the "salad oil" with which they do their cooking? How many people know that the wool clothing on their backs has beeo scoured with petroleum? And so the list of curious questions which suggest their own answers might be multiplied almost indefinitely. The value of the petroleum extracted from the rocks of Pennsylvania during the past 35 years is equal to the amount of the national deht when it attained the highest point.—Tin and Stone.

A PERSON in good health with fair play easily resists cold. But when the health flags a little, and liberties are taken with the stomach or the nervous system, chill is easily taken, and according to the weak spot of the individual assumes the form of a cold or pneumonia, or it may be jaundice. Of all cases of "cold" probahly fatigue is one of the most efficient. A jaded man coming home at night from a long day's work, a growing youth losing two hours' sleep over evening parties two or three times a week, or a young lady "doing the season," and overfed children with a short allowance of sleep, are common lnstances of the victims of the cold. Luxury is favorable to chill-taking; very hot rooms, soft chairs, feather heds, create a sensitiveness that leads to catarrh. It is not, after all, the cold that is so much to be feared as the antecedent condition that gives the attack a chance to do harm. Some of the worst colds happen to those who do not leave their house or even thelr bed, and those who are most invulnerable are often those who are exposed to change of temperature, and who hy good sleep, cold bathing, and regular habits preserve the tone of their nervous system and circulation.

ONE of the rarest coins of the United States mintage was recently sold in Boston for $1200. It was a silver dollar of 1804. There are many stories about this issue of United States coin. It is said that there are not more than eight known to he in existence. According to the record of the United States mint, 19 570 sllver dollars were coined in 1804. One of the stories about the use of this mintage is that they were sent to Africa to pay off American sailors who were eogaged in a war on the Mediterranean with Tripoll at that time. It is said that the natives took a very great fancy to these coins and that sailors parted with them for souvenirs. It was stated that later the chiefs of tribes valned these dollars so highly as ornaments and tokens that they took great trouble to get possession of them and that, partly through rohhery and trickery, they succeeded in getting possession of all the dollars issued that year. The dollar of 1804 has a flying eagle with 13 stars upon

the reverse, while the face bears the date and the head of the goddess of liberty with floating hair.

I THINK the superb health of my family is to a great extent due to the habit we have of almost living in sunshine. Every bright day all of the shutters are open, and the entire house gets the benefit of sunlight. It drives away dampness, mold, microbes and blue-devils, and puts us all in good humor and health. I cannot imagine good sanitary conditions and darkness. Even my cellar is as light as I can possibly make it, and whatever fruit and delicacies need to be shut away from light I put in close cupboards or covered boxes. I have sheets of canvas that can be thrown over them before they are put away, and always take pains to so arrange my stores that nothing can be injured by an abundance of light. People who live in badly lighted apartments have little color and less health. I for one do not intend to spend my life in an atmosphere of gloom.—New York Ledger.

IT has been said that any good leather may be made waterproof by the following preparation: In half a pint of linseed oil scrape one ounce of beeswax, and add half an ounce of powdered rosin and one ounce of oil of turpentine. Melt all these ingredients very slowly on the fire, taking care that they do not ignite. A coarse earthen vessel is a good thing to melt them in. Saturate a pair of shoes with this mixture while it is warm, applying it with an old paint-brush. The shoes should be of new leather, and have never been wet, and, after they have been thus saturated, they should be hung at the back of the stove or in some equally warm place for at least ten days. At the end of this time they will not only be waterproof, but soft and pliable. The leather should be calf-skin or some strong leather for serviceable wear rather than fine kid.

TO remove oil stains from the pages of a book without destroying the printing, gently warm the stained part with a hot flatiron (so as to take out as much of the oil as possible) on blotting paper; then dip a brush in rectified spirits of turpentine and draw it gently over the sides of the paper, which must be kept warm during the whole process. Repeat the operation as many times as the thickness of the paper may require. When the oil is entirely removed, to restore the paper to its usual whiteness, dip another brush in highly rectified spirits of wine and draw it in like manner over the stained place, particularly around the edges. By adopting this plan, the spots will entirely vanish, and the paper resume its ordinary whiteness.

THE largest kite ever made in the United States is that produced in Durham, Greene county. The frame consists of two main sticks, 28 feet long, weighing each 100 pounds, and two cross-sticks 21 feet long and weighing 75 pounds each. All the sticks were 2x6 inches in dimensions. Over the framework was stretched a great sheet of white duck, 25x18 feet, which weighed 55 pounds. The tail of the kite alone weighed 50 pounds and contained 155 yards of muslin. Twenty-five hundred feet of one-half inch rope served as kite-strings. The plaything cost $100, and when it is mounted into the air it exerts a lifting power of 500 pounds. Six men once permitted it to ascend 1000 feet.—Albany (N. Y.) Express.

A WAY of determining weight of sheet iron without putting it on to the scales is thus described by the *Ironmonger*: It has been found by experience that a square foot of iron plate one-eighth of an inch thick weighed almost exactly five pounds, and this forms a basis for a very simple and easy rule. As a square foot of iron one-third of an inch thick weighs five pounds, a square foot of one-fourth-inch iron will weigh ten pounds, and we can say that the area of any sheet iron (or plate iron) in square feet multiplied by the thickness in one-eighths and multiplied by five, will give the weight of the piece.

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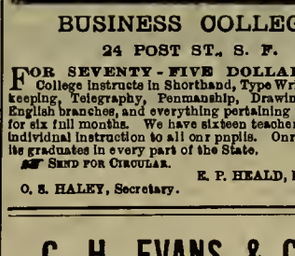

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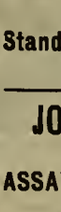

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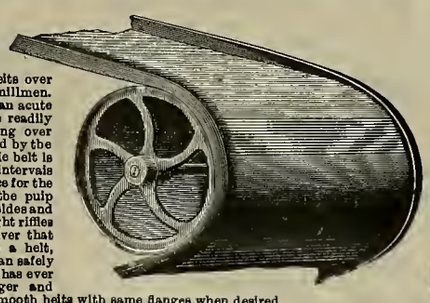

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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned

CALIFORNIA.

Amador.

RICH ROCK FROM THE IAMA.—*Ledger*, July 21: S. H. Fredricks and Wesley Nichols, who have sunk a shaft 56 feet deep on the ridge between Pioneer creek and the Amador wagon-road, have drifted 80 feet along a ledge of $100-rock, taking out 16 tons and leaving exposed 100 tons more. Wednesday morning, D. Gutmann and George B. Heazleton came down from the Irma, after having spent several days at the property. During their stay a valuable discovery of quartz was made at the 100-foot level, where an orebody was encountered and many tons of rock exposed, which the mining men at the National hotel Tuesday night pronounced the finest they had seen for years. The rock assays about $250 per ton in free-milling gold. The Mattley ranch, which some months ago was bonded to J. B. Francis, will soon be the scene of active mining operations. A company is being formed for the purpose of prospecting the property, and within a month work will be commenced. Gutmann and Heazleton, the promoters are organizing a company with the understanding that a shaft will be sunk 1000 feet without cutting a station or running a level. They are discussing the proposition of putting in an electric hoist. Enough of the stock of the proposed company has already been spoken for to make possible the amount of prospecting contemplated. As it is intended to run all winter, it is necessary that work be commenced immediately, in order that a supply of material can be placed on the ground before the rainy weather sets in.

FORTIFIED AND GARRISONED.—*Ledger*, July 21: The visit of Attorney Eickoff to Jackson last week changed the condition of affairs at the Amador gold mine very materially. Under his instructions each building on the property was nailed up, all the fences and gates made secure, and notices posted warning people to keep off the premises. As a further protection six armed men were stationed over the premises with instructions to allow no trespassers to enter upon the property. These precautions were taken for the purpose of preventing the Amador Gold Mine, Limited (the English contingent), from securing possession of the property and thereby complicating matters. The English corporation has transferred its interests to a new company known as the Jackson Gold Fields, which, it is understood, will redeem the property before the 30th of this month, at which time the statutory right to redeem expires. The property was sold by the sheriff upon execution about six months ago, and was bid in by J. P. Darling, who represented the Amador Gold Mine, or the American contingent. There can be no question in regard to the Amador Gold Fields being determined to redeem the property, for the company's attorney, W. J. McGee, has been picking up some of the judgments that stand against the concern at fifty cents on the dollar. These judgments are in addition to those included in the execution upon which the property was sold.

El Dorado.

WORKING A BAR.—El Dorado *Republican*, July 22: A force of men was set to work this week on Diving Bell Bar in the Cosumnes river below Huse's bridge by the local company which was organized several months ago to work the ground, as reported at the time. They are getting lumber on the ground at present to construct 1000 feet of flume four feet wide to carry the river water at its low stage past the bar. The water will be diverted into the flume by a wing dam at the upper end. As soon as the ground is freed from this surface water, a hydraulic elevator will be operated from a ditch that will give about 100 feet fall. D. C. Wickham will manage the undertaking for the company in which he is also interested as a partner. Diving Bell Bar has a great reputation among the old residents of that part of the county as being very rich, but has been a difficult place to work on account of the water and difficult drainage.

GOLD MINING PROSPECTS.—Will Wilkinson has been pushing a tunnel on the old New York lead for some time and has secured some good prospects. The vein passes through his father's place and also through Paterson's and Dr. Baum's farther south, all being within the town limits. Wilkinson had 14 tons of ore milled on the Big Tunnel property last week, and it returned him $20 per ton. He has a tunnel in about 60 feet and has uncovered a four-foot ledge and some smaller veins. J. W. Dench owns the north extension on which some work has been done, a shaft being down 50 feet and a tunnel in 100 feet. Twenty tons of ore milled from this part of the vein gave $7.50 per ton. Kohn & Smith own ground on the same belt still farther north and have a tunnel about 100 feet long run into it. A sample of ore from their ledge yielded $7.50 per ton. Some of the capitalists who are looking for gold-bearing ledges ought to take a look at these properties.

Kern.

GOLER CAMP.—Los Angeles *Express*, July 22: Goler Camp is about 40 miles north of the horax road. It is situated in a little canyon with plenty of water. The climate is delightful on account of the elevation and dryness of the air. One needs a pair of blankets at night. A cool breeze is blowing nearly all the time, so that the hills of the Mojave desert are not the bugaboo we have always supposed. There can be no better climate for those suffering from pulmonary complaints. The trip from Mojave is not pleasant until the hills are reached. Water may be had at the Six Mile House; again at Kane's Springs, 20 miles farther; again at Mesquite Springs, three miles farther, and at the Borax pump, four miles toward Goler. Leaving the borax road at Mesquite Springs and taking the canyon brings one to the Colorado Camp and Big Nugget Gulch, where the $250 nugget was found June 27th last. From three to five men are working the Big Nugget Claim and have two dry washers. The owners think they have something good and are not on the sell. Harvey Hanson, the veteran prospector, is looking for the lead from which the big nugget came. Charles Fahey, of San Bernardino, has interests here and is now out looking at claims of Mr. Ayers, with a view to purchasing. The Benson boys are doing well, as are also Reid & Co. Many others are making from first-class wages up. Quite a number of miners and prospectors have come in within the last two weeks. The Bergeron & Barlingame Company will soon have its men at work developing its lodes.

Mono.

A SUCCESS.—Bridgeport *Chronicle-Union*, July 18: The Standard Con. electric works are a grand success, the mill of the company at Bodie now being run by the power, which is transmitted from the company's power-house on Green creek, a distance of 12 miles. The Electric Company is to make a 30 days' successful run before the Standard Con. can be asked to accept them under their contract. The time will expire in the early part of next month. We congratulate Superintendent Leggett on the success of his enterprise.

Nevada.

A DIVIDEND.—Grass Valley *Union*, July 21: Dividend No. 14, of 10 cents per share, has been declared by the W. Y. O. D. Mining Company, and is now payable at the bank of Messrs. Weissbein Bros. & Co. Up to date the mine has paid an aggregate amount of $1.20 per share. For the past few months extensive improvements have been in progress at the mine, involving a heavy outlay, yet it is able to declare a dividend this month. When the improvements shall have been completed, the indications are such that larger dividends will follow.

OSBORNE HILL MINE.—Grass Valley *Telegraph*, July 22: After the lapse of over 25 years, the Osborne Hill has resumed work. Mr. L. P. Goldstone has, for months, been getting a company together for the purpose of operating the famous old mine, and he has succeeded. Steam was started up about a week ago and everything is going on in a business like manner. A fine building has been erected over the hoisting works and the machinery is running just about as good as machinery can run. The shaft has been cleaned and newly timbered down to the depth of 250 feet and it is a substantial piece of work. Below this depth there is some water, but the pumps have no trouble whatever in handling the water. At the depth of 250 feet there is a large drift running south. The miners have cleaned out this drift for a short distance and found a ledge not entirely well defined as the quartz is a little mixed at present. The best miners say that it is bound to soon develop into a fine ledge. The drift is badly caved, but it is the intention to follow it up for some distance at least. In the meantime the shaft will be cleaned and timbered to the bottom, where sinking it further will be commenced. Many of our old timers remember how high excitement used to run about Osborne Hill when some of the splendid ore would be taken out, and they now all rejoice that after so many years have gone by that the old mine has entered again upon an active career. Mr. Goldstone has done some substantial work on top and underground, and the mere locality in which the mine is located should almost insure its success.

Placer.

MORNING STAR DIVIDEND.—Colfax *Sentinel*, July 22: The Morning Star mine of Iowa Hill has declared another dividend of $2 per share, aggregating $4800. This makes dividend No. 31 and many more are expected from the famous producer. The stockholders are mostly composed of Grass Valleyans and Colfaxans, and surely they have a "good thing" in the Morning Star. The mine is looking fine at present.

Sierra.

HOISTING WORKS.—*Mt. Messenger*, July 25: Hoisting works are being erected at the Rising Sun quartz mine, near Alleghany, and Supt. L. H. Newton expects to have them completed by the first of next month at the latest. We learn that a couple of fine ledges have been struck at the Mount Moriah mine, lately purchased by a Minnesota company of M. A. Lawler and Dan Glavin. Mr. McIntosh, the manager, has several men developing this property.

Siskiyou.

GULN DUET.—Yreka *Journal*, July 22: Cunha & Co., after a two months' run in their mining claim at Hawkineville, about two miles north of Yreka, formerly the old Tom Greenwood claim, cleaned up some 15 pounds of gold dust. They had free water all the time, this season having been favorable for a good supply in washing the pay gravel. Other claims in the vicinity on Rocky Gulch and Canal Gulch have also paid well the past spring and present summer. The river miners on Klamath river, in the Honolulu district, are all busy at present in sinking down to the old channel at their various claims, and will soon be taking out good quantities of the glittering dust. The Spangler Brothers at mouth of Humbug creek have a good deal of trouble in getting down to bed rock, on account of the extraordinary amount of water in the ground this season. They have to pump out both the Klamath river and Humbug creek water, and will be obliged to put in another pump. The bedrock is not less than 35 feet below the surface of the creek, but when reached for successful operation, will no doubt yield handsomely. They can run the pumps by water while their new double action steam engine performs the hoisting and removal of boulders. The Eastlick Bros.' mine at Oro Fino, Scott valley, cleaned up over $15,000 last week, the supply of water in their ditch for hydraulic mining being unusually good for this season. Jim Sterling has sold his quartz mine on Hungry creek, Siskiyou mountain, to an Oakland company, and is now making arrangements to build a wagon road from Cole's or some point in that vicinity to the mine. The Spencer mine in the Siskiyou foothills, near Cole's mountain house, still continues to pay handsomely, and bids fair to prove a permanent lode of great value, in fact a rich bonanza. A custom quartz mill on Siskiyou mountain, for crushing the quartz from Hungry creek and other creeks in that section, would develop a very rich quartz mining district, covering a vast extent of country in California and Oregon along the State boundary line. Jillson & Co., of Henley, are still piping in blue gravel at Klamath river in Cottonwood district, and will continue to do so until the water gives out, as it will take but little time and small amount of water in cleaning up. The lower strata of blue gravel will be blasted and dug out for crushing in an arrastre, owing to the trouble of dissolving by water, which method, it is believed, will prove successful in extracting the gold with less lose and expense. Henry Harris, the industrious quartz miner, is now prospecting a fine looking ledge on Trail Gulch, near the old saloon cabin on the Humbug road, just over the divide on Humbug creek. Rich quartz discoveries have been made at the head of Shasta river, about seven miles west of Igerna. W. N. Dale and Pat Kiernan have a ledge, nearly two feet in width, which prospects well, showing gold to the naked eye, and assaying over $600 to the ton. If this discovery should cause the development of other ledges in that section, a rich mining camp may be the result, as there is an abundance of water at hand for running mills and washing purposes. This locality is on the dividing range between the Shasta and Trinity rivers, where the Sacramento, Scott, Trinity and Shasta rivers originate from extensive springs.

A NEW DISTRICT.—Yreka *Journal*, July 26: The new quartz mining district on the headwaters of Shasta river, west of Igerna, continues to attract considerable attention, and gives promise of proving a rich mining section. Prospectors are searching in every direction for new ledges, with good success. The Ashland *Tidings* says Philip Mullen, of the Spencer quartz mine, near Coles, in this county, was at that place last week, and says the ledge cleans up $4000 a month with its little steam hammer mill of two stamps. The river miners on Klamath river, in the Honolulu district, are now beginning to wash up bedrock gravel, the Bentz Bar Company having sunk down two cuts, and the Centennial and other companies having also reached bedrock. The heavy rainstorm of May 8th last delayed operations to a great extent by breaking in wing, head and foot dams, besides interfering with getting derricks, wheels and other apparatus in place, as the river was raised about five feet, due mainly to heavy cloudbursts in the mountains and at the head of the stream. The Greenhorn Blue Gravel Company having made an opening to the old north shaft, now secure better air for safe working, as this opening provides a good draft. The men are drifting near the south shaft, and also opening the old underground drain from the old works, as water is getting scarce for washing the gravel taken out. The Spangler Brothers, at the mouth of Humbug creek, are putting in another pump to drain their claim, as one pump is only sufficient to keep the water stationary, the supply being just about equal to the capacity of the pump. Another pump will enable them to work successfully, and supply the money market with a good quantity of gold dust. J. H. Schroeder, of the Deadwood Mountain quartz mine, between Yreka and McAdams' creek, was in town last Saturday, and is kept quite busy of late in getting out quartz and keeping the mill running day and night. He has plenty of quartz out to keep the mill running perpetually, and intends to have enough at all times by working sufficient force in the tunnels. The mill is run by steam and there is an abundance of water on the mountain this season to supply the batteries, engine, and for all other purposes. The big current wheel built at American Bar claim on Klamath river below Hornbrook by an Oregon engineer, whose name is not Ferris of Chicago, is reported to have gone to pieces on first turn or half turn. It was 43 feet wide and 18 feet in diameter, constructed with a view of operating all the apparatus, in place of having a wheel for each purpose as in other claims. The remnants have been picked up all the way down the river, probably as far as the great sand dunes on the ocean beach, where the raging Klamath mingles with the placid Pacific. It may have been stout enough in the bucket beams, but the main shaft, made of wood, proved too weak to sustain the immense wheel. The claim prospects well and will yield handsomely with right kind of apparatus to work it. The McCloud river *Pioneer* says a large quartz mill is to be put up right away on a bonanza ledge about 12 miles from Round mountain and a few miles from Pitt river. The ledge is but slightly developed, but the ore prospects highly. We know of several mills having been erected at Copper City, and one at Bullskin, to work the quartz from "rich" but partially developed ledges, and the result was dead failures. Develop a mine, then put up machinery, is the safe miner's plan.

Tuolumne.

A REAL GOLD BRICK AT COLUMBIA.—*Union-Democrat*, July 22: We have often heard it said that everything some men touch turns to gold, but we have never seen it more thoroughly exemplified than in the case of our esteemed friend G. L. Mead, who some time ago purchased the old Masonic Hall, paying therefor the sum of $600, for mining purposes. Up to date the output has been nearly $4000 from the rear portion of the lot. Last week he began taking down the large brick building which covers the front part, the brick alone being of the best quality and worth many hundreds of dollars, but it is not this particularly of which we speak. One evening this week after he had finished his work on the building for the day, as he was about to go home to his cabin, he thought he saw something glittering in the pile of brick which lay at his feet, and on which the last rays of the setting sun were shining. Hastily picking up the broken brick in which the object lay embedded he was surprised and delighted to find it was a lump of virgin gold which weighed nearly three and one-half ounces, there being nearly $60 in the nugget. According to old timers the brick used in the construction of the building was made in Springfield from the auriferous clay which underlay the rich surface soil which yielded so enormously and made that locality so famous for its rich placer during the early fifties. It was said at the time the brick were made several pieces of gold were picked out of the clay by the workmen. L. C. Tibbitts and family are rusticating at the Last Chance mine. He contemplates resuming work on the Eagle and Yellow Hammer mines, both of which are promising properties.

NEVADA.

Washoe District.

COMSTOCK SITUATION. — Virginia *Chronicle*, July 25: A *Chronicle* reporter had an interview with Chas. H. Fish, president of the principal north-end mines, to-day, who arrived last Saturday on important business connected with the companies which he represents, and for the purpose of submitting propoeals to various corporations doing business with the mining management, looking to reductions in freights and fares, the price of water and lumber, and also to request a reduction in the present scale of wages paid miners and mechanics. It had already been agreed before Mr. Fish left San Francisco that the salaried officers of the various mining companies of which Mr. Fish is president, the Con. Cal. & Va., Ophir, Mexican, Union Con. and Sierra Nevada, have already been notified that on and after Tuesday next their salaries will be cut down at least 25 per cent, with the exception perhaps of the Virginia secretary of the Con. Cal. & Va., whose onerous duties entitle him to the salary at present received. Mr. Fish states that the percentage of reduction in officials' salaries has not been made equal, and in some cases will be as high as 50 per cent, owing to the large salaries received by some; and 25 per cent would cut no figure in the way of reduction. To-day the documents were mailed to the Virginia Miners' Union, Gold Hill Miners' Union, and Mechanics' Union of Storey county, setting forth reasons why a reduction of 25 per cent in the scale of wages paid should be made. Proposals have also been submitted to the Virginia & Truckee Railroad Company, Virginia & Gold Hill Water Company, Sierra Wood & Lumber Company—all having headquarters and agents in this city—asking a reduction in rates in conformity with the reductions contemplated in other quarters. The Lake Tahoe Wood & Fluming Company, located in Carson, will be served with a similar document. The documents transmitted to the various corporations and labor unions are signed by the presidents and secretaries of every mine on the Comstock, with the exception of two in Lower Gold Hill, whose works are at present shut down. It is not probable that the problem will be solved for at least a month. The various corporations will take time to consider the proposition, some of the interested officials of which are at present absent. Superintendent Yerington of the V. & T. will not arrive until to-morrow. Mr. Fish, having completed the business for which he visited the Comstock, will return this evening to San Francisco. There was no truth in the statement made by the San Francisco *Report* of Friday last that one of the objects of his visit to the Comstock was to look into the feasibility of shutting down the C. & C. shaft, and working the bonanza mines through the Ophir. The impracticability of such an arrangement is patent, and there is no danger of the C. & C. being shut down, unless for repairs.

Central District.

GOOD ORE.—*Silver State*, July 15: County Clerk Dunn arrived last night from Central district, where he has been working upon his gold mine for the past month. He is enthusiastic over his prospects, as the mine is showing up well, with plenty of rich ore in sight.

Comet District.

SUPPLIES.— Pioche *Record*, July 13: Ed. Freudenhall departed yesterday morning with a load of supplies for his mines in Comet district. He is so confident that silver will be restored in a short time to its full value that he told some of his friends he did not intend to come back to Pioche until the price of the white metal did raise.

Eureka District.

DULL.—Eureka *Sentinel*, July 22: Times were dull here previous to the great depreciation of silver, but now the condition is deplorable in the extreme, as there is no employment here of any kind for the laboring classes, and if no relief is afforded them in the next 60 days the wolf will be at the doors of many deserving persons.

Silver Peak District.

GOLD CLAIMS.—Walker Lake *Bulletin*, July 22: About 30 men are employed in the district. John Chatovich will start up his mill in about ten days. As this is nearly all a gold-producing country, the discount on silver effects the

miners very little. If the report that a prominent San Francisco capitalist intends to buy up the principal group of mines in this district proves true, this will soon be a lively camp. Sam Wasson made a 16 days' run at the Silver Peak mill last month and cleaned up $6590. The mill broke down on the 1st, but was started again on Wednesday.

Morey District.

SHUT DOWN.—Belmont *Courier*, July 24: We learn that Mr. Cohen has shut down the mines at Morey on account of the war on silver. The Rothschild Bros. are making their power felt in Nye county as well as in the balance of the United States.

Belmont District.

THE MILL. — Belmont *Courier*, July 22: Messrs. Warburton & Atwell are running the concentrator by steam power. The Monitor-Belmont mill's whistle was heard in town on Thursday afternoon last for the first time in years.

Tuscarora District.

NAVAJO.—*Times-Review*, July 22: The stopes above the 350-foot level show no improvement since last report. Those above the 150 level are looking about the same.

BELLE ISLE.—South intermediate No. 2 extended six feet, vein small but good grade. No. 2 upraise, same level, extended 11 feet. The stopes are looking about the same.

ARIZONA.

MINES CLOSED AT WHITE HILLS.—S. F. *Chronicle*, July 24: Judge Henry Schaefer, the discoverer of the noted White Hills mines, A. T., arrived here yesterday. He has just completed the sale of five patented claims in the Gold Basin district, 15 miles east of White Hills, to Sigafus & Bird of San Diego, and will now remain here for some time. He says that, owing to the silver depression, all the White Hills mines have closed down and a pay-roll of $1000 a day stopped to labor. The town is extremely quiet and must remain so, the Judge says, until the silver interests improve. He says that the White Hills developed as a leading gold camp, each ton of ore producing from one to six ounces of gold, but the stoppage of work has taken place, nevertheless, because of the attitude against silver. He thinks much the same thing is being repeated in many other camps, and it will only be a short time until there will not be sufficient gold even to answer the demands of the country. "I came up some time since from Arizona to Los Angeles," he said, "intending to invest about $16,000 in electrical engines, but the silver depression came and I did not invest a cent. One dealer there told me the fight against silver meant a loss of $1,500,000 a year to Los Angeles. It has retarded business in a thousand different ways, and will, I think, cause hard times in the East. Messrs. Sigafus & Bird, who purchased the Gold Basin mines in the Hualapias district, will proceed to work them as soon as the hot weather moderates a little.

ANOTHER FEEDER. — Tombstone *Prospector*, July 22: The Missouri copper group of 13 claims in Middle pass of the Dragoon mountains are being developed in a systematic manner by M. M. O'Gorman, who has them bonded until February next. It is understood that Dick Gird, of the Chino sugar ranch, who made his fortune out of the Tombstone mines in early days, is at the back of Mr. O'Gorman. The tunnel which is being run into the mountain is nearly 70 feet long, and during this distance has been all in ledge matter. Some good-sized veins of rich black oxide have been encountered, while the whole distance the ore will pay to smelt. The tunnel will be driven to the distance of 100 feet. It was the expectation to strike the hanging wall before this, but no sign of it has been uncovered. A great deal of the ore will run 60 per cent copper. That there is an immense deposit of copper there has been considered a certainty, but capital to develop it was not interested until Mr. E. Sydow located the properties and interested Mr. O'Gorman in them. A most valuable addition to our county will soon be in a productive shape. It is but 18 miles from Tombstone and is reached by as fine a natural road as ever was marked out in any country.

MILL DESTROYED.—Kingman *Miner*, July 20: The Big Sandy mill, at Signal, was discovered to be on fire at about 3:30 o'clock Wednesday afternoon, the fire bursting from the boiler room. The fire had attained too great headway to be overcome and the mill was soon a smouldering ruin. Although the mill has been idle for some years the tanks have to be kept full of water, and on Wednesday the watchman had fired up and was running the pumps. While absent from the boiler room a spark, it is supposed, flew from the furnace into some inflammable material and thus started the conflagration. The mill was built about five years ago by Hugo Richarde, of Prescott, and W. D. McCright, the Kimble brothers and some others of Signal, who afterwards sold the mill and the Signal mine to the present owners. The loss is said to be $60,000, covered by an insurance of $10,000. The burning of this mill is another backset to the town of Signal, and it was soon to be fitted up as a gold mill and work the gold ores from the surrounding camps.

MILL MACHINERY.—Hugh McCrum came in from San Francisco Saturday, where he has been purchasing additional machinery for the McCrum Sampling and Milling Company, with works at the Silver Belt mine. C. M. Clark left for the works last evening, and expects to have mill machinery in full operation by Wednesday. Mr. McCrum and his people have expended fully $13,000 on this enterprise up to date, and will without doubt soon commence to realize handsomely on the investment.

BIG BUG DISTRICT.—J. R. Ritchie, the mining man, was in yesterday from Big Bug district, at which place he is running the Pratt mill under lease, working ore from one of his claims, and also working custom ores. He is having a pipe line of 1000 feet laid to more conveniently handle the water supply.

COLORADO.

CLOSED DOWN.—*Mining Industry and Tradesman*, July 22: Since the mining news from Lake county was put in type, the information has come that the Maid and Henriette has closed down and is pulling its pumps. This was the greatest producer at Leadville and gave more employment to men in mine and smelter than any in the region. Mr. Moffat proposed to keep the mine in operation, on some scale, even at a loss, with wages at $2.50 per day. The Miners' Union refused to accept this rate. Such action by the miners is incomprehensible. Every mining camp in the State is full of idle men, hundreds of whom are in want. Every wagon-road and path in the mountains is full of men who are tramping and packing their blankets, every train on the railways carries men out of the country who are stealing their rides, relief committees are needed even in Leadville, and still these miners, at the dictation of a few stupid, hot-headed fools, refuse to work for $2.50 per day.

IDAHO.

WILL RESUME WORK.—Silver City *Avalanche*, July 22: We are informed by Superintendent Frederic Irwin, of the Idaho and Pittsburg Mining and Milling Company, that the company's mill will be started to-day (Saturday). Our readers will remember that the property was completely shut down on July 1st, when the price of silver fell from 82 to 60 cents. Enough ore is mined to keep the mill running steadily until the middle of August, and it is hoped by the company, as well as everyone in the camp, that before that time the "powers that be" will have brought about a change which will enable the owners to see their way clear to resume operations in the mines and keep the mill running steadily. The Black Jack is one of our richest and largest producers, but its value is so largely in silver that present prices render it impossible for it to be worked at a profit. The management had extensive improvements under way at the time orders were received to close the property, work on which will not be recommenced until the monetary question is settled. The men who were employed in the mill at the time it was shut down are given work again, and are now back on the mountain.

CUSTER COUNTY MINES.—Salt Lake *Tribune*, "Not a mine of any prominence in Custer county is in operation to-day," said A. J. Crook of Clayton, Custer county. "Never in the history of that rich galena-silver ore-producing country has the outlook appeared so gloomy. With silver at 63 cents per ounce, the mine-owners in my section of the State would lose about $4.60 per ton on all ores shipped to the Denver or Omaha smelters. We don't propose to lose that amount, and have closed our mines. Some development work is being done at each of the principal mines of the county, but not an extra man is receiving employment. The mines near Clayton will probably start up about the 1st of September and run possibly 60 days. The smelter will also be started to work some valuable ore already on the dumps. As our supply of coke is limited, the run will, of necessity, be a very short one. The mines at Bayhorse will not run at all this season except to work particularly rich veins, and the mills will be in operation only long enough to clean up the ore now on the dumps. We cannot run mines in that section at a profit with silver selling less than 95 cents an ounce. In the first place, coke laid down in Clayton costs us $35 per ton as against $6.50 in Denver or Omaha; we have a 72-mile haul in order to reach the railroad. Everything the mine-owner uses in the treatment of his ores, and everything the miner uses and needs, costs too much and is way out of proportion to the market price of the only commodity which we have to offer—silver." As to what he intended doing, Mr. Crook said: "I have found it necessary to get out of that country, at least for the present, and have set about looking up gold properties and agricultural land, for outside of a gold mine I consider a tract of fruit and agricultural land the most valuable.

LOST RIVER COPPER MINES. — Wood River *Times*, July 22: A party headed by Franklin Farrell, president of the Parrott Mining Company, and Benjamin Tibbey, a noted practical expert of the same company, of Butte, Montana, spent the last week at and around Ketchum and at the copper mines owned by Messrs. Sharp, Reed, Davidson and others, on Lost River, and left on yesterday's train for their homes — Mr. Farrell for Connecticut, where he has large foundry interests at Waterbury and Ansonia. The gentlemen of the party are heavy capitalists, ranking away up in the millions. They were very favorably impressed with the copper prospects, and intimated that they may take hold of them.

MONTANA.

AT ANACONDA.—*Review*, July 20: The Anaconda Company are grinding along in about their usual manner. They are handling 70 cars ore per day at the upper and lower works. They are getting their wood from Mill Creek. They have about the usual force of men at work. There can be no question but they are preparing to very materially increase their output soon, probably about the time the new railroad is completed, when they can ship on their own line. It is now stated that the company have changed their plans about the connections with the mines at Butte and will connect on the east side. The change was brought about on account of the large amounts asked by property owners over whose property the line would pass. At the Anaconda and St. Lawrence, development work is still in progress on the 1200-foot level of the former and the 1100 of the saint. At the latter property a number of men have been laid off until the work of cutting the station is completed, but ore is being hoisted in large quantities from both mines and about 70 cars daily are being shipped to the smelter. The High Ore is employing about 160 men, and the Green Mountain will soon be employing double that number. At the Mountain Con. or Buffalo new shaft development work is in progress, and as soon as connections are made with the old workings, work will be resumed with old-time vigor. The same may be said of the Humboldt, the new shaft of the Anaconda Company. Parties in from French Gulch say that placer properties there continue to look up; that they will soon be taking out pay. It is understood that parties are now in Anaconda who are arranging to bond one or two of the Daly mines, near Cable. If the arrangement is completed a small force will soon be put to work on development. The fire-clay banks about Anaconda have proved quite valuable. The ones over on Lost Creek and those southeast of town are taking out material every day, which is brought to Anaconda. Some of it is shipped to Helena.

NEW MEXICO.

NOT PROMISING.—*Southwest Sentinel*, July 22: A few men are at work in the mines at Georgetown under leases, but if there is not an improvement in the price of silver it is not probable that they will continue work much longer. The outlook for Georgetown is not very promising just now.

PINOS ALTOS.—The scarcity of water at Pinos Altos this summer has been a very serious drawback to mining operations there. There is a large amount of ore out on the dumps and in the mills which cannot be treated until there is a supply of water to keep the mills going. With plenty of water at Pinos Altos there would be no trouble about keeping the mines there in continuous operation. Various plans have been proposed to supply the camp with water, but none of them have been deemed feasible enough to put into operation. If artesian water could be obtained there, the problem would be solved. An artesian well could be put down for a small fraction of what it would cost to pipe water into the camp. The experiment is worth trying. If artesian water could be found at Pinos Altos, the camp would be restored to its place at the head of the mining camps of the Territory.

PYRAMID.—There is a small force of miners at work at Pyramid, but the work being done in other camps in this county south of the Southern Pacific railroad is inconsiderable. With silver even at a dollar an ounce, the number of miners employed in that part of the county would be many times as more than are now at work.

COOK'S PEAK.—There is no early prospect that operation will be resumed on a large scale in Cook's Peak district. There has been considerable development work done there within the past few months, and large bodies of ore are exposed ready to be taken out. The mines are in such a shape that an output of over a hundred tons a day could be kept up for some time. The mines in the camp were never in better condition than they are now.

OREGON.

STRIKE IN THE VIRTUE MINE.—*Bedrock Democrat*, July 24: Just before the First National Bank opened its doors for business yesterday morning, Superintendent George W. Borman and Book-keeper I. H. McCord of the Virtue mine entered the side door and a few minutes after the front doors flew open and in rushed an excited crowd. Thinking that it was a rush of depositors, a *Democrat* reporter immediately made his way to the First National, and instead of being compelled to report a bank failure he was shown an 8½-pound specimen taken from the shaft of the Virtue mine, which fairly glistened with the yellow metal. In fact, the huge specimen is almost literally covered with gold, which stands out in big chunks. It is estimated that the gold in the rock is worth between $1000 and $1200. We were next shown two sacks filled with the same stuff, and taking from his pocket Superintendent Borman displayed a specimen as big as a man's fist, which is worth its weight in gold. The ore will foot up to something like $10,000. As soon as an opportunity was presented, the reporter was granted an interview with Mr. Borman. He said: "We struck the bottom of the shaft, 350 feet, yesterday evening, the first time it has been entirely free from water since the mine was shut down six years ago. I expected to see a fine vein of quartz, but when my optics feasted upon an eight-inch vein of the stuff you just saw in those sacks, I could hardly believe my eyes. Mr. McCord and I at once commenced digging, and when we laid aside our tools it was morning. The showing where we left off is just as good as where we commenced, and there is no telling how long it will hold out. I have always had great faith in the Virtue, as you are aware, and told my friends there were 'millions in it.' When the mine was closed down 20 years ago, after an uninterrupted season, I was of the opinion that there was plenty of good ore left, and I guess all will coincide with me now." The Virtue mine was discovered by W. H. Rockyfellow in 1862, and was developed on a small scale until 1865, when a company took hold of the property, working it for several years with splendid results. The Virtue Gold Mining Company was the next to operate the property, and, after working five years, during which hundreds of thousands of dollars were taken out, George W. Grayson purchased the property and realized handsome profits for four years, when the mine was closed down, for what reason the public has yet to learn. Six years ago Mr. Grayson decided to open up the property and sent Mr. Buckminister here to superintend it. After pumping out the shaft and accomplishing some development work, he telegraphed the owner that the ore was too low-grade to pay, and Buckminister was ordered to cease operations. Since that time a number of companies undertook to open up the mine, but their backs were not long enough. Growing tired of this kind of work, Mr. Grayson, knowing that the old producer was a reliable property, concluded to operate it again himself, when along came John Longmaid, of Salt Lake City, about a fortnight ago, who stated that he had a purchaser for the property, and a price was agreed upon, the preliminaries arranged and all was in readiness for the transfer, when Mr. Grayson was informed that the sale was off. The owner of the property kept the pumps at work and operated the mine on a small scale while the sale was pending. He was expected to arrive yesterday, but did not get here. Mr. Grayson has not yet heard of the rich strike and a pleasant surprise awaits his arrival.

BROWNTOWN NOTES.—Grant's Pass *Courier*, July 20: Our miners are plodding along in the old groove. July will see the most of our placer men cleaning up and then they, too, will in all probability take to the hills prospecting for quartz and placers also, for there are doubtless many places where parts of the old and higher chambers are still covered deep by the wearing away and slides of the mountains. Krouse and Baldwin have commenced opening on their quartz claim, north extension of the Griffin ledge, and have found some pretty rock. Griffin has bonded his claim to a San Francisco company. This company represents some millions, and it will soon have a crew of men at work developing the lode and putting up a boarding-house. Beig is hard at work slashing the brush over his hydraulic claim. His water is done for this season. Ehman will soon be closing up, as the water will commence to slacken with this warm weather. The Doney family are getting themselves comfortably fixed and are opening their claim for extension work. There are a number of prospectors in the south about the O. and C. line. As there is a quantity of quartz there, good news may come any day. The Snicker Creek miners are hard at work opening new claims and prospecting for new deposits.

UTAH.

THE SCALE FIXED.—Park *Record*, July 22: Supt. R. C. Chambers and the committee appointed by the miners to represent their interests held a consultation Monday last at the Ontario mill office, and thoroughly considered the proposed reduction. The first conference lasted several hours and the committee was well pleased at the candid and social reception met with at the hands of Mr. Chambers. They presented their case in a strong light, and Mr. Chambers made notes and figures on their proposition and told the committee he would figure on them and give an answer in the evening. Another session was held in the evening, and the following scale of wages agreed to: Men receiving $5 were cut to $4; those getting $4.50 to $3.75; blacksmiths were reduced from $4 to $3.50; other $4 men to $3.25; $3.50 men to $3; $3.25 to $2.75; $3 to $2.75; surface men from $2.50 to $2.25, while the board of all men stopping at the mine and mill boarding-houses was reduced from $1 to 90 cents. The cut takes effect from and including the 18th of July. Though no special order has been issued nor anything said to the millmen, the foremen at those works say the matter was adjusted for all, and that, so far as they know, the cut will be universal on the ratio fixed by Mr. Chambers and take effect from the same date. The agreement seems to meet with pretty general approval, though there is of course some kicking, and several men have quit. Their places were immediately filled, and everything is working smoothly and bids fair to continue.

BROMIDE GOLD.—Salt Lake *Mining Journal*, July 26: James Whitney, who is operating in the Henry mountains with George R. Barton, arrived in this city this morning, says the Grand Junction *Star*, carrying with him 55 ounces of gold, the run of the Bromide stamp mill for 10 days. The Bromide mine, which is owned by Messrs. Cannon, Farrell, Bradish, Caswell and Sumner, is producing some very excellent ore this summer. The mill is only a five-stamp. If the facilities were increased, the product would be relatively larger, as there is no question any more that the Bromide is a great producer.

WASHINGTON.

THE METHOW GOLD CAMP.—Okanogan *Outlook*, July 22: Robt. Stokesberry came in Monday from the Methow gold camp, where he had been prospecting for a couple of weeks. He brought a lot of fine-looking free-gold specimens from some ledge he had discovered west of the main camp, on Squaw creek. He has located four claims. The Mountain View and Sunset are located four miles west of the Highland Light, on which a force of men is now at work sinking; and the Fourth of July and Old Reliable are a mile and a half west of the same claim. Mr. Stokesberry has returned with the necessary apparatus to begin sinking on his properties. Jack Summers and Tom Deaver were in from Squaw creek this week after a stock of provisions and mining tools. They are getting ready to sink a shaft on the Lookout mine, and expect to go down 50 feet. This claim is on the main vein and is one of the best showings in camp. Just before coming to town the boys ground up a few pounds of the rock and panned out $60 worth of gold. It took them just two days to pound out the $60. This was a good enough prospect for the boys and they brought their dust to town, exchanged it for silver and bought some tools to commence work with. They report work being pushed on the Highland Light, for which the owners recently refused an offer of $60,000. It is a splendid looking prospect and the owners are not anxious to part with it.

Market Reports.

The Markets.

SAN FRANCISCO, July 27, 1893.

The Copper Market.

Henry R. Merton & Co. of Loodon report the stocks of copper in England and France, and afloat thereto from Chile and Australia, on the 1st of July as follows:

	Range.	Tons.
1891	£55 5s 0d	57,325
1892	44 17 6	56,604
1893	43 10 0	49 955

Prices af the close of June were almost as low as any time during the first half of the year. They were 7s 6d less on the 31st May. This month has witnessed a still further depression. The quotation in London on the 17th was £42 12s 6d for spot lots aod £43 for futures. It is a curious circumstance that supply has comparatively little to do in fixing a value for this metal. By all laws of analogy, the price at the close of June this year, with less thao 50,000 tons in sight for Englaod and France, should have been bigher than a year ago and two years ago, when the quantity in sight was much larger. But the opposite fact is the case, and all ordinary rules of reason are scattered to the winds. The unexpected has agaln happened.

The Metals.

No special changes have developed in the metal market during the week. Copper has been steady. Lead and tio have weakened. The latter shows the greatest variation for the week.

San Francisco Metal and Coal Market.

ANTIMONY.		**STEEL.**	
Per lb	— @ 14	English, lb	— @ 18
BORAX.		Cantoo tool	— @ 8½
Refined, in car lots	— @ 7½	Bl'k Diam'd tool	8½@ 15
Powdered, do	— @ 7½	Pick & Hammer	6½@ 10
Coocentrat'd, do	— @ 6½	Machinery	4 @ 5
All grades jobbing at advance.		Toe Calk	— @ 4½
COPPER.		**TINPLATE.**	
Bolt	22 @ —	B. V. steel grade	
Sheathing	22 @ —	14x20, spot	— @ 5 87½
Ingot, jobbing	— @ 14½	Charcoal, 14x20	— @ 5 87½
Do, wholesale	— @ 13½	Do roofing, 14x20	— @ 5 87½
Fire Box Sheets	22 @ 24	Do, do, 20x28	— @11 75
IRON.		**PIG TIN.**	
Bar, base	— @ 3	Spot lb	— @ 24
Norway, base	— @ 4½		
PIG IRON.			
	Spot.	**COAL.**	
Eglintoo ton	20 00@—	SPOT FROM YARD—PER TON.	
Glengarnock	21 00@—	Wellington	$8 00
Am. Soft, No. 1	22 00@—	Greta	7 50
Shotts No 1	22 00@—	Nanaimo	5 50
Puget Sound	20 00@—	Gilman	6 00
Clay Lace White	21 00@—	Seattle	5 50
Langloan	22 50@—	Coos Bay	5 50
Gartsherrie	22 50@—	Cannel	8 50
Barrow	22 50@—	Egg, hard	12 00
Cargoffeet	22 00@—	Wallsend	7 25
CHROME IRON ORE.		Scotch Splint	8 00
Per ton	10 00@—	Brymbo	7 50
LEAD.		West Hartley	8 00
Pig	— @ 4½	TO LOAD—PER TON.	
Bar	— @ 5½	Australian	5 37@—
Sheet	— @ 7½	Liverpool Steam	5 50@—
Pipe	— @ 6½	Scotch Splits	00@—
SHOT.		Cardiff	5 2@—
Drop, sizes *smaller* than B, bag of 25 lbs	$1 80	Lehigh Lump	11 00@—
Do do, B and *larger* sizes bag of 25 lbs	2 00	Cumberland	12 00@—
Buck, Balls and Chilled do, bag of 25 lbs	2 00	Egg, hard	10 00@—
QUICKSILVER.		West Hartley	7 50@—
Home trade, pr. flask	42 50 @43 00	**COKE.**	
		English, to load	$9 50@10 00
		Do, spot, in bulk	—@10 00
		Do, in sacks	—@11 50
		Cumberland	9 50@—

NEW YORK, July 20.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.	Copper.	Lead.	Tin.
Thursday	32¾	70½	10 25	3 60	19 15
Friday	32⅜	69½	10 25	3 50	19 20
Saturday	32⅛	69	10 25	3 50	19 20
Monday	32⅛	69	10 15	3 40	19 00
Tuesday	32¼	69¼	10 20	3 50	18 90
Wednesday	32⅜	69¾	10 20	3 45	19 00

Mining Share Market.

There is very little doiog on Pine street in these days. The Comstock mines furnish the bulk of the business and just now there is douht as to what will be the outcome of the move to reduce the expenses up there and in the city offices. It is stated that the railroad and the water people have agreed to cut down their charges, and the wood people, whose profits are small, have agreed to reduce as much to the mining compaoies as the railroad will redoce to them. The way the matter now stands, it depends upon the Miners' Union to meet all the other interests. The Miners' Union will hold a meeting at Virginia City to-night (Thursday) and will take formal action. The officers in this city have already agreed to accept a reduction of salaries. If the whole plan is carried out, affairs on the great lode will doubtless be improved, but if the Miners' Union holds out for present wages, some of the mines will probahly he closed.

The move of the S. F. Stock Board to increase its business by listing gold properties without charging any fee except the anoual dues is quite an important event on Pine street. Only one company has accepted the offer, and that is a drift-mining company of the Forest Hill Divide, Placer county. It is the Mayflower, quite a famous rich mine of this class. We have referred to this subject in another column.

At the annual meeting of the stockholders of the Lady Washington Mining Company 95,000 shares were represented and the following officers elected for the ensuing year: R. E. Kelly, president; Herman Zadig, vice-president, and E. B. Goodrich, George H. Pippy and Josepb McBoyle, directors. J. E. Jacobus was elected secretary, and the financial statement showed a credit of $827.13.

At the aonual meeting of the stockholders of the Savage Mining Company 91,470 shares were represeoted aod the following officers elected for the ensuing year: George R. Wells, president; Charles H. Fish, vice-president, and Thomas Anderson, William S. Wood aod Herman Zadig, directors. E. B. Holmes was re-elected secretary, and R. C. Keating, superintendent. The secretary's financial statement showed an overdraft of $8022.28. The superintendent's report showed that during the year they have extracted from the various levels of the mine 18,372½ tons of ore, which has been reduced at the Nevada mill. The gross bullon yield of all the ore milled was $282,379.39; discount on same, $75,341.27; net coin received, $207,038.12. The average car-sample assay of all the ore milled was $23.38; the average battery assay, $20.85; the percentage obtained per ton, $77.37.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

The following brief list by telegraph, for July 25th, will appear more complete on receipt of mail advices:

California—David L. Albert, Fort Bragg, mechanical calculating device; Walter F. Burns, San Francisco, automatic weighing and recording-scale; Benjamin Field and E. P. Clark, Los Angeles, feed water-heater and purifier; Andrew Fraeier, San Francisco, ore-cruehing machine; Frederick H. Hanseman, San Francisco, water gauge; George E. Hoyt, San Francieco, gas engine; Milee J. Nigbtingale and J. B. Stearns, Oakdale, seed sower; Edwin R. Thomson, San Francisco, apparatus for reducing bituminous rock; Sarah S. Freeman, Los Angeles, dressmakers' rule; Wertheimer Company, San Francieco, three patents for cigars.

Oregon—David Craig, Macleay, hop trellis; Clark R. Long and C. H. Kline, Haisey, steam cooker.

Arizona—Andrew Knudeon, Tucson, combination tool.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. to the shortest time possible (by mail for telegraphic order). American aod Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY AND LOCATION.	No.	AMT.	LEVIED.	DELINQ'T AND SALE.	SECRETARY.
Alhambra M Co, Nev	17	25c	July 14	Aug 18, Sept 11	F S Schwarze, 324 Washington
Alta M Co, Nev	43	15c	April 25	Aug 4, Aug 25	L Osborn, 309 Montgomery
Americao and Mexican M Co	10	2c	Juoe 28	July 31, Aug 19	F M Husted, 522 Montgomery
Best & Belcher M Co, Nevada	54	25c	June 6	July 14, August 4	L Osborn, 309 Montgomery
Bodie Cons M Co, Cal	16	15c	July 24	Aug 28, Sept 25	M E Willis, 309 Montgomery
Bulwer M Co, Cal	8	10c	July 20	Aug 31, Sept 22	L Osborn, 309 Montgomery
Caraelo Land and Coal Co, Cal	5	$2	July 21	Sept 1, Sept 20	R McDoble, Mills Bldg
Crocker M Co, Arizona	14	5c	June 8	July 13, August 3	A Waterman, 309 Montgomery
Crown Point M Co, Nevada	61	25c	June 12	July 18, August 8	J Newlands, Mills B'ld'g
Exchequer M Co, Nevada	36	1c	Juue 29	Aug 1, Aug 29	C E Elliot, 309 Montgomery
Gold Mountain M Co, Cal	5	$1½	July 13	Aug 16, Sept 4	J F D Curtis, 325 Montgomery
Gray Eagle M Co, California	33	—	July 10	Aug 16, Sept 14	C C Harvey, 309 Montgomery
Hale & Norcross S M Co, Nevada	104	50c	June 21	July 27, Aug 18	A B Thompson, 309 Montgomery
Kentuck Cons M Co, Nev	6	10c	July 11	Aug 15, Sept 5	A Waterman, 309 Montgomery
Lady Washingtou M Co, Nev	9	10c	April 18	Aug 9, Aug 30	L Osborn, 309 Montgomery
Mexican M Co, Nev	48	25c	July 17	Aug 22, Sept 12	C E Elliott, 309 Montgomery
Occidental Con M Co, Nevada	13	10c	June 22	Aug 16, Sept 6	A K Durbrow, 309 Montgomery
Peer M Co, Arizona	15	5c	June 8	July 12, August 2	A Waterman, 309 Montgomery
Peerless M Co, Arizona	20	5c	Juoe 15	July 20, Aug 10	A Waterman, 309 Montgomery
Potosi M Co, Nevada	38	25c	July 11	Aug 15, Sept 5	O E Elliott, 309 Montgomery
Red Jacket Cons M Co, Nevada	1	5c	May 24	July 15, August 5	S M Capp, 415 Montgomery
Savage M Co, Nevada	81	25c	June 20	July 25, Aug 14	E B Holmes, 309 Montgomery
Utah Cons M Co, Nevada	18	10c	June 16	July 18, Aug 5	A W Havens, 309 Montgomery
Ventura Asphalt Co, Cal	1	50c	July 11	Aug 26, Sept 18	F. A. Brooks, Mont'g Block
Weldon M Co, Arizona	7	5c	June 15	July 16, Aug 9	A Waterman, 309 Montgomery

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Cons New York M Co, Nev	Anoual	C E Elliott, 309 Montgomery	Aug 5
Irma M Co, Cal	Anoual	H H Bodwell, Crocker Bldg	Aug 10
Navajo M Co, Nev	Annual	J W Few, 310 Pine	Aug 8

DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE
Bulwer Cons M Co, California	5	L Osborn, 309 Montgomery	Oct 20
Champioo M Co, California	10	T Wetzell, 310 Pine	May 15
Oocs New York M Co, Nevada	10	C E Elliott, 309 Montgomery	Feb 15
Great Western Quicksilver M Co	25	A Halsey, 328 Montgomery	Oct 8
Mayflower Gravel M Co, California	10	D M Kent, 330 Pine	June 30
Pacific Coast Borax Co., California	1 00	A B Clough, 230 Montgomery	Jan 10
Standard Cons M Co., California	10	J W Few, 310 Pine	July 25

Notices of Recent Patents.

Among the patents recently obtained throngh Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

EXCAVATOR.—Henry P. Bennett, Phœnix, A. T. No. 501,400. Dated July 11, 1893. The invention relates to that class of excavating or ditching mschines in which a rotating wheel, provided with a series of elevating buckets, receives the material from a plow below and delivers it above to a vibratory discharge shovel which throws it to one side. The present invention is an improvement upon that excavating and ditching machine for which the same inventor made previous application. It consists in a novel controlling apron hetween the vibrating shovel and the discharge hopper to which the hnckets successively deliver the material. It also consists in making the shovel perforated and in the novel constrnction and arrangement of the means for vihrating the shovel.

GEAR CONNECTION FOR PLATFORM SPRINGS.—Joseph P. Farrell, S. F., assignor to O'Brien & Sons. No. 501,411. Dated Jnly 11, 1893. This relates to that class of spring gears for vehicles in which the springs are of the platform pattern and their adjacent ends are united hy means of shackles. The invention covers a novel constrnction of the ends of the springs and in connection therewith of a novel shackle connection. The object is to make an easy-riding spring which will not snap or hreak like a rigidly connected spring and which will neither work loose nor rattle and will he durahle.

Liberal Offer to Miners.

The Colliery Engineer Company, Scranton, Pa., advertises in another column that they will present free of charge, postage paid, a copy of the fifth edition of The Coal and Metal Miners' Pocket-Book, price $2, just issued, to every person who will send them the names of at least ten mine officers or miners in either coal or metal mines, as soon as one person on the list subscribes for *The Colliery Engineer*. This is a very liberal offer, as the new edition of their Pocket-Book is a work which should be in the hands of every miner, mine official and student of mining. It contains 600 pages of memoranda and tables relating to coal and metal mining, and is the most complete technical pocket memoranda of the mining industry published.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, July 27 18 3.

9:30 A. M. SESSION.

400 Belcher	30c	100 Overmau	10c
200 Best & Belcher	55c	300 Potosi	40c
150 Bullioo	15c	250 Savage	32c
200 Challar	25c	50 Sierra Nevada	40c
550 Con. Cal. & Va	1.10	350	35c
350 Crown Point	30c	100 Unioo	35c
100 Hale & Norcross	50c	250 Yellow Jacket	45c
200 Ophir	60c		

2:30 P. M. SESSION.

100 Alta	10c	300 Mexicao	35
300 Belcher	30c	50 Overman	10c
400 Challar	25c	100 Savage	30c
50 Conferecce	45c	100 Union	35c
100 Coo. Cal. & Va	1.10	100 Yellow Jacket	40c

Mining Property For Sale.

A Drift Gravel Mine of 250 Acres at Forest City, Sierra Co., Cal.

Blacksmitb ebop aod tools, T-rails for 800 feet of tunoel, 500 feet tuooel completed. Mioe incorporated. For particulars inquire of the undersigned at Forest City.

B. F. DERICKSON,
Forest City, July 25, 1893.

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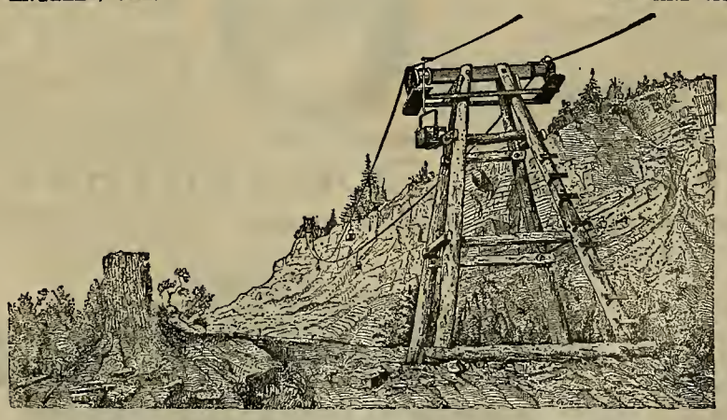

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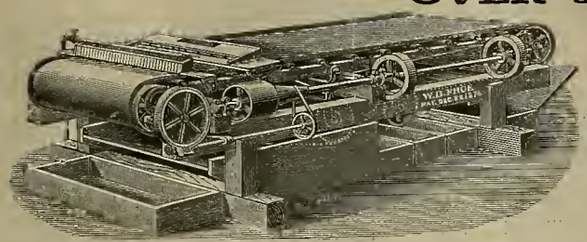

GLADSTONE MINING COMPANY, C. J. Clark, M. E. Gen'l. Supt. FRENCH GULCH, Calaveras Co., Cal., Dec 12, 1891.

MESSRS. ADAMS & CARTER, San Francisco, Cal.—DEAR SIRS: During my experience in mining and milling, I have used twenty-four of your four-foot Frue Vanners on different kinds of ore, both gold and silver. I have made competitive tests against them with other widely puffed-up concentrators and have always found the FRUE in first place. When I built this mill (20 stamps), I determined to put in six-foot Frues in order to save space and machinery. I am now running four of your six-foot machines and they have been going for TWELVE MONTHS. They are taking the pulp from 20 stamps, crushing a minimum of fifty tons per day, and do better work than the four-foot tables. They require no more attention than a four-foot table and handle at least twice the quantity of ore. I have run them up to 80 tons per day and could not see that they were crowded. They stop and start as easily as the smaller tables and have the advantage of double capacity with the same bearings and wearing parts, requiring no more oil, and no more wear and tear than the smaller tables. My repair account for the past six months has been too small to mention. In order to give an idea of the work they are doing here I will state that the ore has varied monthly from $5 to $20 per ton and the tailings from nothing to 60 cts. per ton. I will conclude by saying that I cannot endorse the six foot Frue Vanner too highly, and it is the only table that I would have in my mill.

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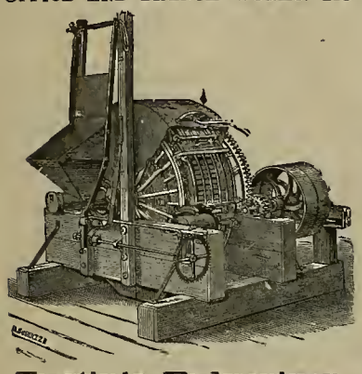

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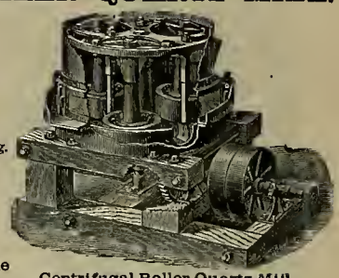

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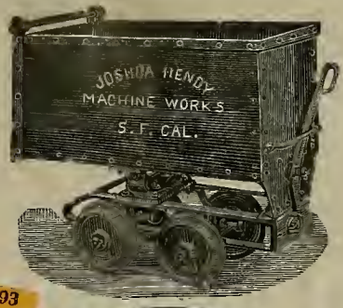

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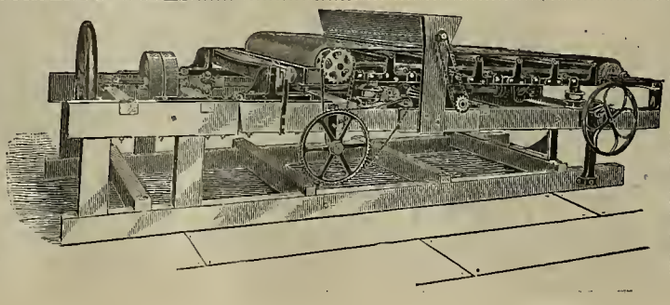

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MR. THOS. McGLEW, President McGlew Ore Concentrator Company—Dear Sir: I take much pleasure in endorsing your very superior Ore Concentrator. When I was requested to examine your concentrator, I did so under protest, declaring that I would have none other than a Frue, as after many years experience with different concentrators, I believed them to be the best.

Now, after a thorough trial of the McGlew Ore Concentrator, on ores difficult of concentration, I emphatically pronounce it the best concentrator of any I have ever used in handling my ores. It is doing CLEANER and CLOSER work than I had believed possible for any concentrator to accomplish.

Samples of pulp and tailings, taken every hour, dried, mixed and assayed, show * * * from West ledge, a saving by your concentrator of 94½ per cent; from East ledge, * * * a saving of 92 per cent.

The concentrator runs very easy and requires but slight attention. One man attends to rock-breaker, crusher and concentrator.

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VOL. LXVII.—Number 6.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, AUGUST 5, 1893.

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SINGLE COPIES, 10 CENTS.

Working Drift Mines.

Mr. Ross E. Browne estimates that the yield of the Forest Hill Divide district has been about $30,000,000 in gold. The richest drifting channel on the divide was, doubtless, the Forest Hill channel, or series of parallel, narrow courses under the town of Forest Hill, which, according to hearsay, yielded by drifting an average exceeding $1000 per running foot.

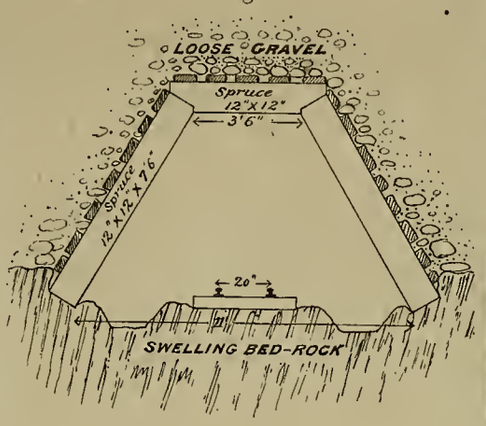
Many of the ancient channels and benches, especially those of the earlier period, have been exposed in complete cross-section by the erosion of the modern streams. For some time after the first discovery, in 1851, the mining of the district was practically confined to these exposed sections. The methods were naturally ground sluicing, hydraulicking and drifting direct upon the rich layers. The drifting extended farther into the hill, and deeper tunnels were driven to drain off the water and facilitate the delivery of the gravel.

The exposed and easily accessible deposits were gradually exhausted, and bolder enterprises were started. Shafts were sunk through the volcanic cap and a deeper system of channels discovered. Large quantities of water were encountered, and this method of attack was found too expensive. At the present time all of the important mines of the divide are worked through deep drain and tramway tunnels, driven at great expense through the bedrock. Upraises to the channel bottom are made at intervals, and the richer gravel extracted. According to the firmness of the cementing substance binding the pebbles together, the gravel is either washed through sluices or crushed in a stamp mill.

The tunnels are driven either by hand or machine drills. By hand drilling the progress is from forty to seventy feet per month, and the expense $6 to $10 per running foot. By machine drilling the progress is from one hundred and fifty to three hundred feet per month, and the expense $12 to $18 per running foot.

The Hidden Treasure was discovered in 1875, by Mr. William Cameron. This discovery is noteworthy, as the channel was not exposed anywhere near the point of attack, having been cut away by a volcanic gravel channel. Mr. Cameron based his calculations upon the similarity of the deposits at the Mountain Gate mine and at Gas Hill, and started a tunnel, which passed through six hundred feet of volcanic gravel, and struck the white channel at precisely the right elevation. The pay channel is wide and the gravel loose and free-washing. The channel is reached through 600 feet of tunnel in volcanic conglomerate. The tunnel follows the channel up stream and is partly in gravel, partly in bedrock. The length of the tunnel from surface to gravel breast is 8500 feet. The gravel is breasted by picking and caving, and is shoveled into cars having a capacity of one ton each. These cars are pushed by hand through short gangways to the main tunnel and thence run by gravity to the dump-house on the surface. One horse hauls a train of 11 empty cars into the mine.

Fig. 14.



The pressure from the gravel is not great, but the swelling bedrock has been a source of trouble, driving the legs of the timber set inward and crushing the cap. After many unsuccessful attempts to overcome this difficulty, the legs were given an increasingly greater bottom-spread, until finally it was found that they remained stationary. The swelling bedrock is removed from time to time and the track adjusted. The accompanying cut shows the form of tunnel timber-set now used in bad swelling ground. (See Fig. 14.)

Sets are first put in four feet apart, and in the course of a few months center-sets are placed between these. Timber-sets on this plan have now been in place three years, and are still in good condition. In the 8500 feet length of tunnel, there are about 4000 sets of timbers. Two men are kept constantly employed in easing and repairing the sets and adjusting the track.

In breasting the loose gravel the ground is timbered closely, as shown in sketch (Fig. 15). The excavation is partly filled in or walled up with large bowlders to prevent extensive caving.

Fig. 15.

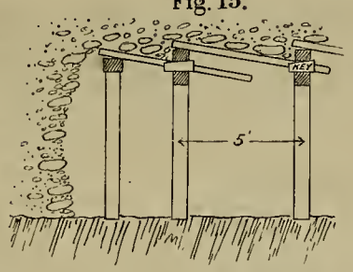
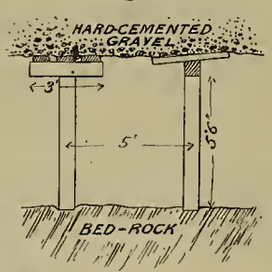


Fig. 16.



METHODS OF TIMBERING IN DRIFT MINES.

The Mayflower was discovered by Mr. F. Chappelet, and he was for a long time its superintendent, but is now the president of the company. The gravel is hard and cemented, involving the use of a large quantity of powder in breaking and a small expense in timbering. It requires milling. The gravel-breasting is carried on by drilling single-handed; blasting with No. 2 dynamite powder; timbering with short caps and posts five or six feet apart. (See Fig. 16.) Excavation in great part is filled in with bowlders. A gravel breast, 75 feet wide and 6 feet high, is driven ahead along the length of the channel at the rate of 80 to 90 feet per month, and there are required two such breasts to keep the 20-stamp mill running at full capacity. Prospect drifts, in gravel, cost $2.50 to $3 per foot length.

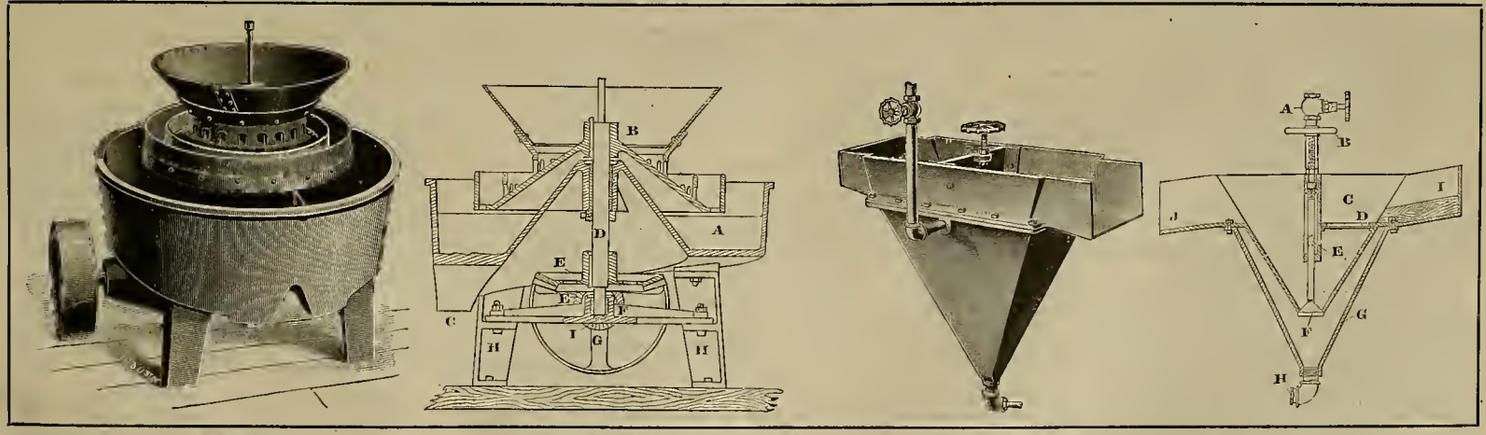


FIG. 1.—Elevation. FIG. 2.—Section. FIG. 3.—Elevation. FIG. 4.—Section.

DODGE'S DISTRIBUTOR. DODGE'S SIZING BOXES.

(See page 83.)

THE Alma Gold Mining Company has incorporated, with a capital of $1,000,000. Directors—George Heazelton, John B. Francis, J. N. Wells, W. B. Hamilton, A. H. Bodwell.

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Comment.

An improved plan for operating the MacArthur-Forrest cyanide process has been devised by Almarin B. Paul of Shasta county, whereby all wet-crushing stamp mills or other wet-reducing machinery working gold ores can be utilized and worked as usual. The plan allows the taking up of the coarser gold first; then comes the cyanide treatment. The plan does away with all banking or rehandling of tailings, and without the loss of any of the slimes of the "muddy water." It is said to be very practical and inexpensive, and makes quite a saving of time in the treatment. Moreover, ores can be worked to a higher percentage. Mr. Paul was the first to introduce the process in California, and has had a great deal of experience with it. He has built several mills for operating it, and is doubtless the best-posted man on the practical working of the process this side of South Africa, where 27 mills are using it with great success.

Shasta county, from the earliest days, has been a great gold-producer, and up to the period of the stoppage of hydraulic mining there was a large yield of gold from the gulches and placers. In pioneer days Shasta was especially famous for its large output of gold. There are at this time, in various localities of the county, thousands of acres of gold-bearing ground that would be a paying proposition if water for washing were available. As it is, during the winter and when the heaviest rains are on, hundreds of miners turn out and get large rewards for their labor. Of late years, however, attention has been largely given to the development of the quartz interest. As a quartz county its future is very promising. Minerals of every variety are to be found in special localities, gold, silver, copper and iron being the most abundant. The principal outlay of capital and labor has of late been given to the development of the gold-bearing lodes.

The sale of the Harqua Hala gold mines of Arizona to a London syndicate for one and a quarter million dollars proves that our British cousins will invest in gold properties outside of South Africa if they can be shown a good thing. These mines have proven themselves good producers already, and, with improved facilities furnished by capital, ought to do even better in the future. This sale will stimulate other mine-owners to put their properties before foreign purchasers. The largest sale made recently in this State was to a French company who purchased a hydraulic mine in Trinity county, and are examining other properties in the same region. It is greatly to be hoped that these ventures will prove profitable to the investors. There are plenty of good mines on this coast which should attract capital from abroad.

The depression in the mining industry all over the world extends even to diamond mining. The price of shares in the De Beers Consolidated Diamond Mining Co. operating the Kimberley mines, South Africa, have fallen in value about 20 per cent in the last month or so. This company practically controls the diamond markets of the world and restricts the production. However, its product being entirely an article of luxury, the demand does not now come up even to the restricted production; hence the fall in value of shares. One of the curiosities of the present condition of affairs in mining is that the shares of gold-mining properties have fallen almost as much as those of silver mines, and this in the face of a greatly increased and marked demand for gold properties. This is especially noticeable in Colorado. It is probably due to the fact that people who have money are holding on to it, and there is a scarcity of investors. The holders of the stocks need money and are willing to sell, and there being slight demand, prices fall accordingly.

It has been satisfactorily (or unsatisfactorily) proven that one big wheel will not serve as good a purpose as half a dozen smaller ones in river-bed mining operations. An Oregon engineer devised one for the American Bar claim on the Klamath river below Hornbrook, in Siskiyou county, this State, which was 43 feet wide and 18 feet in diameter. It was built with a view to operating all the apparatus, instead of having a wheel for each purpose, as in other claims. When turned loose it took half a turn or so and then its remnants began to scatter all along the river. The main shaft, made of wood, was not strong enough for the purpose. The miners owning the claim will now fall back on the regular old-fashioned size of wheel and drop any projects which might rival Ferris of Chicago.

The miners and other employes of the Vancouver Coal Company, at Nanaimo, B. C., have been asked to accept a reduction of wages ranging from 20 per cent for miners to from 10 to 20 per cent for others in and about the colliery. A mass meeting was held on Tuesday and a prolonged discussion ensued. Many present were in favor of the mines being closed rather than accept a reduction. It was finally decided to appoint a committee of five to wait upon the superintendent of the company and lay before him a proposition that the miners will agree to accept a reduction of 10 per cent providing the wages of all other underground laborers remain as at present, and that a written guaranty be given that when the market improves wages will be raised to the present standard. The miners' proposition to accept a 10 per cent reduction was refused. The management insist upon a 20 per cent reduction on all men making more than $3 per day and 10 per cent on those earning less. On Wednesday another meeting was held and the miners submitted their proposition to the effect that they would meet the management half way. The miners will accept a reduction of 10 per cent and other underground workers five per cent. The committee laid the proposition before the management. It is believed the management rejected the proposition issued as an ultimatum. The miners have all along met the company in a friendly spirit and shown anxiety to help them in their present difficulties, but are unquestionably determined not to accept a reduction of 20 per cent, which is considered excessive.

One would suppose from the recently framed memorial to Congress of the Anti-Debris Association that the hydraulic miners had asked for the removal of all barriers to that class of mining and the unconditional repeal of the Caminetti law. The fact is, however, that the miners have not yet asked for anything whatever; have made no petition to Congress to repeal the law; and have no expectation that they will ever again be permitted to hydraulic except behind dams. The Anti-Debris Association reassert their opposition to dams, though the Government engineers recommend them. The association says in its memorial: "We do not believe that dams can be erected that will protect us from injury." As the courts have given permission to the biggest mine in the State to mine behind a dam, and the engineers will see them put at all the mines asking for a license, this "belief" of a lot of farmers along the river will have no weight at all. The miners will try and make some arrangement by which the dams will be built for them, and then pay for them out of the yield of the mines. They want to work their properties and keep the debris out of the rivers behind dams; but the anti-debris people do not want these mines worked, dams or no dams. But the gold is wanted just now and it is safe to say those mines will eventually be worked one way or another.

John F. Kidder of Nevada county, superintendent of the Nevada county narrow-gauge railroad, has been appointed Debris Commissioner by Governor Markham. This is a new office created by the last Legislature and is to continue for four years. The duty of the commissioner will be to consult and advise with the Board of Engineers of the United States, who have been appointed with power to adopt plans and specifications for the construction of works for the impounding of mining debris. The Debris Commissioner is required to examine and pass upon the merits of such works and to determine whether or not such works are calculated to and will protect the navigable waters of the State, and to keep a record of such determinations. The Legislature appropriated, out of the general fund of the State treasury, $250,000—no warrant against said sum to be drawn or paid until the United States Government shall have appropriated at least an equal amount—to be used in the construction of the works for the impounding of the mining debris. Mr. Kidder is a civil engineer of acknowledged ability. His many friends are confident of his fitness for the new position, and the appointment is specially pleasing to the residents of Nevada county—the leading gravel mining county of the State.

Comstock Miners' Wages.

The miners on the Comstock do not take kindly to the proposition to reduce their wages 25 per cent, as proposed by the mine-owners and managers. They say that this percentage of cut in the salaries of the officials does not particularly affect them, but the same cut in the daily wages of the miner is something serious. It is claimed that the miners' wages form only one-sixtieth per cent of the cost of operating Comstock mines. The cost of transportation, wood, water, milling, etc., have always been excessive, as have also been the office salary lists. In the opinion of the miners, with expenses suitably reduced in these directions the miners' wages could be maintained as at present. The Miners' Union has been considering the proposition, but has arrived at no definite conclusion as yet. The amount claimed to be in the treasury of the Union is $50,000, with $10,000 promised from the unions of San Francisco, and also quite a sum from Butte City, Montana, which on a former occasion was aided by the Virginia Miners' Union. As they are figuring on their resources, it looks as if there would be vigorous protest on the part of the union.

The miners themselves know all about the mill operations and the salaries paid for useless officials. They know of many instances where the mine loses thousands by milling ore on which the mill makes thousands. They know where there are dozens of officers to one or two miners in the cases of a number of companies. It is natural for them to think that if the mines were honestly managed, there would be no need of a reduction of wages. The officials have already accepted the proposed reduction, but this is a "forced put," because people are objecting to paying assessments. The delinquent list of the Hale & Norcross mine advertised this week occupies four columns of a daily paper. The holders of the stock decline to pay, and give up their stock in preference. This is not confined to this mine, but applies to many others. If assessments cannot be collected, the mines cannot be worked. The only wonder is that this point has not been reached long ago, so barefaced have been the methods of management of many of these properties.

Of course it is in the power of the directors of the companies to temporarily close the mines if the miners refuse the proposed reduction. But there will be many more than the miners out of a job if this is done, and the mines will only be closed as a last resort. As to the views of individual miners on the proposed reduction, the following may be quoted:

One member of the union who was interviewed said: "Our meetings are secret and I can give nothing official. You may say that it will be a big surprise if the miners accept any reduction. Our wages are none too large. We don't propose to sweat in the sweltering drifts and inhale the poisonous gases for less than $4, while men are loafing in San Francisco and drawing fat salaries as superintendents and secretaries of a dozen different companies. We have enough money in our treasury to run us a long time and none of our members out of employment will suffer. Don't believe a word of the talk about putting 1000 men to work at $3. It is all bosh. If the mine-owners meant business they would put their proposition in black and white."

Another miner said: "Begin economy with the mill and we are all on to the racket. Why, not long ago a mine here lost $2000 a month, and the mill that crushed the ore made about $5000 on it. The mill sump-hole takes the money out of the mining industry, and when the mills cheapen, as they can, and still make a profit, there will be no need of a reduction in wages. Let an outsider go down to those heated levels and see if he thinks $4 too large, and aside from that, under economical management and cheap milling, there need be no cut in wages."

The miner asserted that the reports of low-grade ore were misleading. "Why," he said, "I saw ore in a drift

not long ago which assayed $280 a ton, and the car samples of that same ore were reported at $19. The game has been played a long time, and covers up a great deal of crooked work."

Milling Auriferous Gravel.

The milling of auriferous gravel or conglomerate, as carried on at Witwatersrand, South Africa, does not differ very materially from what we do with such gravel in this State. The African conglomerates are quite hard and are more after the fashion of quartz mines, lying as they do in inclined beds. They are then milled in ordinary gold-mills, but the cyanide process is extensively used.

In the drift mines of California only the lower stratum of auriferous gravel is breasted out. Sometimes this is "free-washing" and is sluiced, not requiring milling. A good deal of it, however, is so firmly cemented that it must be crushed in mills just as ore is. The mills used for this purpose crush from 6 to 6.5 tons of gravel for each stamp for 24 hours. By water power this milling costs about 25 cents per ton. By steam it costs from 35 to 50 cents per ton. The gravel of the famous Mayflower drift mine, on the Forest Hill Divide, is hard and cemented.

The gravel is crushed in a 20-stamp mill located at mouth of tunnel. Four batteries of five stamps each. Stamp, 850 pounds; 7½ inches drop; 100 drops per minute. To each battery there is an automatic feeder (Challege), a grooved wooden table, an oscillating rubber (Eureka), and a box of riffles. For screens, punched iron plates are used, two-tenths inch holes, six or seven holes to the square inch.

The mill is run by steam power in the summer and fall, and by water power in the winter and spring. There are provided for this purpose one boiler, 48 inches by 16 feet; one engine of 75 horse power; one five-foot Pelton water-wheel. Amalgamating plates have been discarded. The horizontal grooves across the table are 1½ inches wide, three-fourths of an inch deep, and about 20 inches apart. The mortars and grooves are charged with quicksilver.

The gravel, as it enters the feeders, is picked over by two assorters, who throw out the large clean pebbles and bowlders. About nine per cent of the mass is assorted out in this way and is washed down the sluices without passing through the mill. The tailings pass through 800 feet of sluice boxes. Most of the gold is collected in the mortar and upper groove.

At the Paragon (or Breed & Wheeler) mine, in the same district, they have ten stamps. In place of a punched plate they use a coarse wire screen with 25 openings to the square inch. The mill runs 12 hours per day, putting through 30 tons of gravel in that time, by steam power. They clean up the two upper grooves daily, the mortar weekly, the rubber two or three times a year and the sluices once or twice a year.

Gold-Saving Appliances.

Figs. 1 and 2 on page 81 show the elevation and section of the Dodge machine that divides equally the sand or pulp and water as they come from the battery on the way to the concentrators. In cases where a battery feeds two or more concentrators, adjustable diffusing guides are employed, but these cannot be relied upon, because, by clogging, one concentrator may be supplied with sand and another with water, but with the present machines the pulp is swept over gratings or perforations in the bottom of the revolving pan, uniformly mixed, and is then cut out by dividing plates or diaphragms, one of which is seen in front, and is thus separated into two or more equal parts of sand and water that flow out of sponts at the bottom and to different concentrators. In this manner concentration is equalized and uniform, producing better work and an increase of capacity. One of these machines will take the pulp from a ten-stamp battery or No. 1 pulverizer. It weighs 520 pounds.

Figs. 3 and 4 show Dodge's improved sizing box, which by hydraulic selection discharges the fine material at the wide spout at the top and the coarser material at the bottom. It is a refinement, so to speak, on former appliances for the same purposes. Two sizes of these boxes are made, No. 1 being suitable for 10 stamps and No. 2 for 5 stamps. No. 1 weighs 370 pounds. No. 2 weighs 210 pounds. The Parke & Lacy Co. of this city are agents for these machines.

J. H. CROSSMAN, the old California miner, is lying at the Baldwin Hotel, physically in bad shape. He was brought in on a stretcher, and has been suffering considerable pain, but is better now. A few days ago, just after examining a group of mines near French Gulch, Shasta county, his horse ran away, while coming down the mountain grade. He and J. H. Riddle, who was with him, were thrown out. Both were badly bruised, and Riddle had three ribs broken. Mr. Crossman had his hip dislocated.

Foundry Notes.

Business is exceedingly dull among the iron works in this city at present. None of the shops are running full-handed and large orders are scarce. This, however, is nothing more than might be expected during the present stagnation of general business and the prevailing scarcity of money. Few new enterprises are being inaugurated just now which call for engines or other machinery, nor is much improvement expected in this direction until money matters are on a better basis than is the case now.

The steamship Umatilla of the Pacific Coast S. S. Co. has just been equipped with a refrigerating plant, including a Vulcan refrigerating and ice machine, by the Vulcan Iron Works of this city. This plant is intended to keep a number of cold-storage rooms down to the proper temperature for the transportation of fruit, fish and other perishable food produce, and has proved a great success in every particular. This plant has proved a great convenience, owing to its doing away with the necessity of handling and carrying ice, and it has also been found to be a source of considerable profit as the shippers of such material as requires cold storage are willing to pay an extra price for the privilege of having their materials carried in cold-storage rooms.

A Vulcan refrigerating and ice plant has just been installed in the State Asylum for Insane at Agnews, Cal. This plant has recently been started in operation and is giving great satisfaction to the directors of the asylum.

An attempt is being made in Los Angeles to collect money to build and start a rolling-mill plant in that city.

The first steel steam-yacht ever built on the Pacific coast will be launched from the shipyard of the Union Iron Works to-day. The yacht has been strongly built and very handsomely finished and furnished. She is owned by E. W. Hopkins, the capitalist, of this city. She is built of steel and is finished mostly in teak and primavera. The vessel was built entirely for pleasure and is as comfortable as possible. El Primero will have a speed of about 15 miles an hour. Her engines are triple expansion of 225 horse-power. Roberts' coil boilers are used. The dimensions are as follows: Length over all 137 feet; tonnage length, 120; registered length 111.5; beam, 18; depth, 8.7; draft, 4.2; registered tonnage, gross, 102.99 tons; net, 73.48; displacement, 70 tons. The steamer will draw but four feet of water ordinarily at the bow and less than five at the stern. The cost of the new yacht was $35,000. She will be manned by a crew of six. The deck of El Primero is flush fore and aft, with the exception of a house about the foremast. In this is a pilot-house and a dining-saloon. The after part of the deck will be covered with a canvas canopy. The bulwarks are composed of a rail of teak, steel stanchions, with rope lacings between. The new vessel will fly the flag of the San Francisco Yacht Club, and will shortly start for a cruise to Alaskan waters.

The Lisbon Reclamation District on the Sacramento river has made a contract with the San Francisco Tool Co. for a very extensive pumping plant. There are two 30-inch centrifugal pumps. The two engines which are directly attached are triple expansion with cylinders 8, 12 and 22 inches and 16-inch stroke. There are also two Babcock and Wilcox boilers and two vertical direct-acting air pumps. The engines are to be arranged to work either pump as required. With the plant are two duplex feed pumps and two Gonhert patent water-tube feed-water heaters. The suction and discharge pipes for the pumps are 36-inch internal diameter. The estimated capacity of the whole plant is 60,000 gallons per minute against a 20-foot head. The Tool Co. set up the plant, on concrete foundations, ready for work.

The City Trustees of Sacramento have awarded to A. L. Fish of San Francisco a contract to furnish Sacramento city with water, to be pumped from wells which will be dug in the suburbs. The contract provides the first 1,000,000 gallons be furnished the city at 3.9 cents per 1000 gallons and the second 1,000,000 gallons at 2 cents per 1000. At the end of five years the plant is to be turned over to the city. Before the contract can go into effect the water proposition will have to be first voted upon favorably by the people, which no doubt will be done. Worthington steam pumps are to be used.

The Pacific Rolling Mill of this city, which annually employs an average of 870 men, now has only 200 men at work. There is very little doing in the rolling-mill business at this time, but the company do not want their men to leave and scatter, so keep a small force at work.

Coast Industrial Notes.

THE Trustees of Haywards have decided to issue $33,000 worth of bonds to build a sewer system.

THE value of the money and bullion in the vaults of the San Francisco Mint is $57,997,504.

FIFTEEN or twenty men are at work in the White Horse district, near Wadsworth, Nev.

THE meat-packing house of Mohr & Yoerk, on the outskirts of Sacramento, was destroyed by fire on Monday; loss $20,000.

NEARLY all the mills on the Truckee river have a large supply of lumber on hand, for which there is a very dull market at present.

THERE are 32 vessels in port chartered for grain, with a total carrying capacity of 102,900 tons. The disengaged list consists of 23 vessels.

AN election will be held at Riverside September 12th to provide for the issuance of bonds for $250,000 to build a Hall of Records, County Hospital, new roads, etc.

THE San Antonio Water Company voted last week to issue $350,000 in bonds for the improvement of the irrigation system of Ontario and purchase additional water.

ARTICLES of incoporation have been filed on behalf of the Bear Harbor Lumber Company. Directors—Calvin Stewart, Edward J. Dodge, Thomas Pollard, James Hunter, Aaron B. Cooper. The capital stock of the company is placed at $200,000, of which $80,000 has been actually subscribed.

A CORPS of surveyors is on the headwaters of the North Yuba river figuring on the probabilities and costs of flumming the water down to the plains for irrigation purposes. A number of capitalists are behind the scheme.

THE Board of Directors of the San Jacinto and Pleasant valley irrigation district have issued a call for a special election to be held in August next to decide upon the proposition to levy an assessment of $3000 to meet the current expenses of the district.

GRAY BROTHERS, who have an agreement to grade and remove the sand from Lobos square, as well as a large number of blocks owned by private parties, have commenced on the work. Tracks are being laid on Francisco street for the operation of the sandcars.

Two different companies from Salt Lake are constructing ditches from the Mardis mountains to the placers on the Bruneau river, with the intention of hydraulic mining. These mines are in the northern portion of Elko county, Nev., and embrace several thousand acres that pay from the grass roots.

THE trustees of the California State Mining Bureau have re-elected Jacob Z Davis president, W. S. Keyes vice-president and Henry S. Durden secretary. R. L. Ogden has been made librarian vice C. Robinson, resigned. The lease of the rooms now occupied by the Bureau in the Pioneer building was extended for two years more.

IT is announced that Aspen, Colorado, mine-managers have drawn up an agreement in which the signers agree to work for $1 cash a day and board and a due bill for $2, to be paid when the ore can be disposed of at a reasonable profit. A large number of miners are accepting the conditions and several of the mines will resume in a short time.

THE building associations of the State have been assessed 1½ cents on each $200 share, and proportionately for shares of greater or less par value, to defray the expenses incident to the office of commissioner of loan associations. The two commissioners who are now at work are A Fisher of this city and William A. Spalding of Los Angeles.

THE Crown Point mine in Gold Hill, Nev., started up Tuesday morning with one full shift of men. They will be employed in getting out the gold rock on which a test run was recently made at the Mexican mill. It is probable a night shift will be put on before long to get out the same class of ore, and the mine will work two shifts for some time to come.

THE Oakland city assessment valuations this year will amount to about $43,288,175, exclusive of assessments on steam railroads. The assessment last year, including the railroads, amounted to $44,250,000. That shows that there will not be much of an increase in the tax on city property. The Alameda county assessor did not raise the valuation on city property at all. His increase was on improvements entirely.

AN order was received at Mare Island Navy Yard on Monday authorizing an increase in the forces. It is understood that additional forces will be put on the Monadnock and that her completion will be pushed with all dispatch. From the same source it is ascertained that fully 300 additional men will be put on at the navy yard within the present year and more if found necessary to complete the work already under way.

THE Shasta Land and Development Company has been incorporated in Oakland for the purpose of buying and selling real estate, to sink or bore wells for oil, coal and gas, etc. The capital stock is $10,000,000, divided into 100,000 shares, of the par value of $100 each. The directors are: W. G. Henshaw, Samuel D. Prather, W. J. Mathews, C. B. Gould and Thomas Prather. Each of the directors has subscribed the sum of $500.

TWENTY-SEVEN canneries are packing salmon on the Fraser this year and 1325 boats are at work. Sockeye salmon, which is the only variety packed in quantities, are running now in immense numbers, the average taken by steady fishermen being 1000 for 12 hours. The run has never been better than at present and the canneries cannot get away with the quantities of fish supplied them, though some of them are packing 1500 cases daily.

A NEW enterprise at Woodland is the Woodland Manufacturing Company, which has established a plant for the manufacture of the rotary chopping-bowl, having purchased the right for eleven Pacific coast States and Territories. Woodland has granted the company the free use of the upper stories of the new water works buildings. The directors of the new enterprise are: W. E. Ellis, president; C. T. Bidwell, secretary; R. H. Beamer, N. M. Weaver and M. D. Chamberlin.

A MEETING of the Pacific Underground Electric Railway Company was held at 319 Pine street on Saturday, and officers were elected as follows: President, John F. Burgin; vice-president, J. J. Scrivner; treasurer, A. Craig; secretary, D. B. Richards; business manager, F. S. Chadbourne. This is the company which recently took out articles of incorporation for the sake of retaining possession of patents which they have acquired and which they intend to hold until opportunity offers for utilizing them in this vicinity.

IN Sonoma county there are 832 vineyards aggregating 23,291½ acres, of which 21,908½ acres are in bearing. Of these 21 618 acres are planted in wine grapes, 2328½ acres being on resistant stocks. Only 801 acres are affected by phylloxera. The crop of 1892 amounted to 48,409 tons of grapes. To store this there has been made a cooperage of 5,676,300 gallons, 2 595,000 being of oak and 5,081,300 gallons being redwood. These figures refer not to the

product of the vines but the total capacity of the different wine cellars.

DURING the fiscal year ending June 30th, the customs receipts at San Diego aggregated over $93,000, the value of imports beiog $420,000, while nearly $100,000 worth of exports were made. Two hundred and ninety-six vessels were entered from foreign and domestic ports during the year, nearly two-thirds beiog from foreign ports. The business done during the year as shown by the Custom-house reports was nearly as great for San Diego alone as for the entire customs collections of the district of Los Aogeles. which included the city of Los Angeles and ports of San Pedro, Redondo, Port Angeles aod Santa Barbara.

THE Chino beet-sugar factory, one of the largest in the United States, with a maximum reducing capacity of 740 tons of beets per day, started up Monday morning. This industry gives direct employment to 2000 men in Chino, to several hundred at Aoaheim, and iodirectly to many more, and will furnish an impetus to many branches of trade in the State. The crop of the Chino ranch is better than ever and is estimated at 50,000 tons. The crop to be shipped from Anaheim will reach 10,000 tons. The factory ruos day and night through the season, reducing an average of 600 tons of beets daily. The acreage of beets on the Chino ranch is 4000; at Anaheim 1000. The output for the season will be 16,000,000 pouods of refined sugar.

DURING the month of July local corporations disbursed dividends as follows: Commercial banks, $567,500; gas companies, $73,500; water companies, $74,500; insurance companies, $41,000; powder companies, $12,000; street-railroad companies, $10,000; mining companies, $67,700, aod miscellaneons companies, $1200. The total amount of these disbursements is $847,400, agaiost $1,113,600 for the corresponding mooth io 1892. The decrease is due to the cessation of dividends by certain mining companies, owing to the heavy deolioe in silver. In addition to the payments for July last, which are recorded above, the local savings banks disbursed a total of about $2,000,000 in dividends, making a graod total of $2,847,400 paid in that month.

THERE are at present 29 banking institutions actively engaged in business in San Francisco. The list includes 16 commercial banks, 11 savings banks, and two national banks. There were 27 banks in business in the city on July 1, 1892, and there have beeo four additions to the list during the year. The new banks are Sisson, Crocker & Co., which began business July 11, 1892, and Columbian Banking Company, Columbus Saviogs and Loan Society, aod Union Savings Bank and Trust Company, the latter three having commenced operatioos since the beginniog of the present year. There are two banks in a state of suspense, the Pacific Bank and the People's Home Savings Bank, which are not included in the 29 baoks of the city.

THE Navarro Mill Company of Meodocino county has called a meeting of its creditors. The reason this step has been taken is the incapacity of the company to continue business under existing circumstaoces. The call was a voluotary one on the part of the company, as it saw no way of meeting drafts made upon it. The banks have declined to advance mooey as they have done hitherto, hence the wisest step has been taken to arrest the accumulation of debts. The liabilities are about $500,000, but the assets are $1,000,000. The company is one of the oldest in the State and its mill is the largest, having been built and started up in the year 1860, or 33 years ago. The mill is most completely equipped, an entirely new and modern saw plant having been put in as recently as two years ago. The average quantity of lumber cut a day at these mills is 110,000 feet. The number of employes has never been less thao 500 for the past 15 years, and in busy times 1000 hands have been employed. Tuesday the mills were shut down, aod the 500 men are now out of employment. The lumber business has been very bad.

THE condition of the fruit-canning aod drying industries remains practically unchanged. Of about 25 canneries in this State possibly 10 are in operation, and these at one-half or less than that proportion of their full capacity. Many of the packers are simply filling a few orders which they have received and their operations are but nominal. Of about 50 fruit-drying establishments in the State, less than one-half are ruoning, and these at far below their capacity. There is a large crop of the finest fruit in the world, but the general financial depression, which seems to affect the commercial world in periodical waves, has caused a stagnation which has included in its baneful iofluence the great fruit industry of California. The conservatism of the banks in declining to loan money to the growers aod packers with the liberality of previous years is not alone the cause of the ioactivity of the canneries. There has been a falling off in the demand for the fruit caused by the financial depression in other parts of the world. The loss to the laboring classes is apparent when such a house as the Cutting Packing Company, which formerly had a payroll of $5000 a week during the season, is now payiog oot to exceed $6000 a month for labor and only ruoning two of its three canneries aod those on very short time. A. Lusk & Co. do not hesitate to say that they will not have more than one-half their usual output if they do that.

The Pine Creek Mines, Oregon.

TO THE EDITOR:—As the value of silver mines is rapidly depreciating, and the future of silver to some extent at least has become a matter of uncertainty, it would appear that mining capitalists will turn more of their attention to gold mining.

This camp, Granite mining district, and known as the Pine Creek mines, with Cornucopia as its principal town, is located in Oregon, 60 miles northeast of Baker City, and within 25 miles of Snake river—the boundary line between Idaho and Oregon.

The mines contain about four parts in value of gold to one part of silver, and a portion of the silver is in alloy with the gold, the halance heing in the sulphurets; and as there are no chlorides of silver in the ore, there is no loss of silver by wet crushing. The length of the helt that paying mines have been found in is about six miles north and south and parallel to the strike of the veins, and its width continues westward across the branches of Eagle creek to Sanger, a mining camp, 12 miles distant from Cornucopia.

The first-class veins of the district are traced and located to a distance of 7000 to 10,000 feet, and the veins are from 18 inches to 7 feet in thickness, with a few bulges of outcrop heing much wider. The ore chutes are from 300 to 1100 feet in length—in fact, the chutes are longer than I know of in any other camp.

The average grade of the ores of the best mines must at best be only an approximation to their true value. But I will place the one-fourth of all of the ores of such mines at $8 per ton and one-half at $12 per ton and the remaining one-fourth at $28 a ton. This would give an average of $15 a ton. Many of our mine-owners will consider it too low an average, as considerable ore has heen shipped to Denver and Tacoma and in every instance the returns were above $100 a ton, and in one instance over $1200 per ton was realized; hut all of such shipments were of assorted ore and cannot be used in averages.

In the south portion of the mineral-hearing belt the country rock near the hase of the mountain is slate, hut at the upper portion and top of the mountain the country rock is stratified or secondary granite; and in the middle and north portions of the belt, which includes Bonaoza basin, the couutry rock from base to apex of mountain is stratified granite.

Pine creek, which is a tributary of Snake river, runs south through the district, and through the spring and summer months it contains from 10,000 to 20,000 inches of water and about 1200 inches through the winter. Pine creek divides the district into two unequal parts, and on the mountain slope in the west division are eight parallel veins in a transverse distance of 4000 feet, and the veins are so situated that a crosscut tunnel would cut them all. A majority of the mines located on these veins are in the hands of the original locators, many of whom are farmers in Pine valley and wish to sell.

The altitude of Cornucopia is 4600 feet above the sea level, and the altitude of the hest mines is at 5000 to 7000 feet. Timber is so plentiful that wood is delivered at $2.80 per cord.

The north end of Pine valley, which is 12 miles in length, is within four miles of Cornucopia, and daily through the spring and summer we receive cereals and vegetables from the valley. We have a daily mail from Union, the county-seat, which is 60 miles distant, and a tri-weekly mail from Baker City. There are 140 people in the district.

In the ahove I have given a hird's-eye view of the camp only, without goiog Into detail, as I well know that Californians wishing to invest in mines will do so after a thorough examination and endorsement of the mines hy experts in whom they have the utmost confidence, and my desire is to have experienced mining men come here and examine the mines of the district. Here we have large ledges carrying ore which will pay from 100 to 300 per cent ahove the cost of mining and reduction, and the veins are of such length and so close to each other that a numher of mines can, with great convenience, he worked from the same opening. Here is a great opportunity for the right class of mining men. But this is neither a pocket nor a chloride camp, and men with a few dollars expecting to make a fortune here will do better to remain away. There has been some talk of a railroad from Union to the timber region, west of here, and Baker City is agitating the building of a railroad to the Seven Devils. It would come within 14 miles of this place. Huntington has also heen talking of huilding a narrow-gauge to Cornucopia.

ROBERT KELLY.

Cornucopia, Union Co., Or., July 29, 1893.

Pocket Mining.

NUMBER V.

Free or Decomposed Pockets.

TO THE EDITOR:—The reason why pockets of this class are always found in decomposed quartz is because the combinatlon of the five minerals, mentioned in article No. 4, which are always present in this form of pockets, acts upon the quartz, and, being a strong decomposing agent, soon rots away the ledge at the point where they concentrate. The gold in those pockets is generally rough and "scraggly," and pieces are often found all honeycomhed like pumice-stone where the quartz has decayed away and left nothing in a solid form except the gold. Sometimes in the larger pockets of this class there is smooth gold, similar to well-worn placer gold, found in the center of the pocket; hut, upon examination, it will he found that those smooth nuggets have a coating or glazing of copper on the smooth surface and are more of an orange tint than the rest of the gold in the pocket. Sometimes those nuggets or pieces which are found in the center of the pocket are rough and scraggly on one side and smooth and glazed on the other. Those smooth pieces are found only in large pockets, and in pockets where they are found there is always a large percentage of copper in the mineral combination. Whenever the majority of the colors found in a free pocket trace are in the shape of needle points hroken off or "arrowheads," as the pocket hunter calls them, the trace is seldom worth following up, for the pockets that give such traces are invariably small and seldom amount to over $5 or $6.

They occur on small stringers of quartz not over a half inch in width and often not more than six or eight feet in length, and generally occur in soft, yellow porphyry. The best free pockets are always found in the porphyry or on or near the contact of the porphyry and serpentine. The most of this class of pockets when laid hare are very deceiving to the eye, for the reason that little or no gold is visihle, it being coated and concealed hy the iron oxide, etc.; but, when washed thoroughly in a pan, the decomposed matter will be found to he very rich. Then, again, in other cases, the gold being free from coating, will show so distinctly that the inexperienced pocket miner will think that the decomposed matter in the pocket is much richer than it really is. The flour gold is always in the top and bottom of the pocket; consequently, the flour gold in the trace will be found in largest quantities nearest the pocket when it is still in place, and, again, when the pocket is out and gone, the flour gold will be found in largest quantities near where the pocket originally was.

The experienced pocket hunter will soon detect hy the flour gold he gets in his trace whether the pocket is still in place or not. He does it in this way: By carefully examining the flour gold—if he finds the most of it very light in weight as well as in color, which he can readily detect hy his manipulations with the pan and by watching closely how the gold acts—he soon finds out whether the majority of the flour gold came from the top or hottom of the pocket. His judgment is hased upon the following facts: Say, for instance, that a free pocket contains 200 ounces of gold. The gold which comes from the top of that pocket we will say is worth or assays $17 per ounce; then it will he found that the gold in the center or middle of the nocket will he worth less, say $16.75 per ounce, and the gold in the hottom of the pocket will he worth still less, or about $16 per ounce, so thus it will he seen that the gold gradually diminishes in value from the top to the hottom of the pocket. Where the gold is more alloyed, natnrally, with silver than copper, this feature is more plainly noticeahle; and the prospector, finding the majority of his gold a light color and light in weight, and intermingled with white particles resembling gold coated with quicksilver, he naturally concludes that that gold came from the hottom of the pocket, and it is out and gone, and he is only getting the gold from the hottom of the pocket in the trace.

Free or decomposed pockets occur generally upon ledges that are harren except where the pocket exists, and the size of the pocket depends upon the size or width of the ledge and the amount of the mineral combination which concentrates where the pocket forms. ALEX QUARTZ.

English Mineral Statistics for 1892.

A serious falling off is shown In the value of the mineral products of Great Britain and Ireland last year when compared with that of the output in 1891. In the earlier year the value of the various minerals raised amounted to £91,238,000, but in 1892 it was only £82,350,000—a decrease in round figures of £9,000,000, or 10 per cent. To seek to explain this loss hy pointing out that to a very great extent it is the result of the diminished yield of one mineral only, viz., coal, would scarcely he just, seeing that the mineral in question forms upward of eight-tenths of the entire production. But however that may he. the value of the coal raised last year reached only £66,050 451, as agains £74,099,816 in 1891—a reduction of upward of £8,000,000. After these figures, the remainder drop into comparative insignificance. Leaving stone out of the question, the value of the quantity of which quarried is estimated at £8,667,736, the next most important item is iron ore, the tonnage of which mined last year was 11,312,675 tons, valued at £2.970,632. The value in this instance shows a decline of £385,000, which, considering the stagnation that overshadowed the iron trade last year, cannot be considered extreme. Following the metalliferous minerals, tin occupies the chief position—always excepting iron ore, of course—and the value of the output for 1892 amounted to £734.565, or within £1000 of the figure for 1891. In the well nigh fixed character of its production, tin holds quite a different rank from its sister metals—copper, lead, zinc, etc. In the case of the former of these, the value of the production, which in 1891 had already fallen to the extremely low amount of £20,214, reached little more than half that figure in 1892, or, say, £11,953, a fact which seems to presage the very early arrival of a day when copper mining in Great Britain will he a thing of ths past. The value of the lead ore raised last year was only £296,484, as against £356,783 in 1891, while of zinc ore £104 016 worth was produced, compared with £113,445 worth in the previous year. The statistics of the production of minerals in the different divisions of the United Kingdom show that the value of the production in England was £58 476,040; in Wales, £13,572,812; while the value of the output in Scotland reached £9 837,740. Ireland comes a long way hehind all her sister countries with a total of £387,128.—Industries and Iron.

Prospectors' Prices for Claims

TO THE EDITOR:—Some time ago I read an account of a prospector who told some capitalists to pay him what they thought the mine was worth, and they gave $10,000 for it, and in your comments you said if prospectors would more generally do likewise they would always get the value of the prospect. My experience has been different. I know prospectors generally set too high a price on their prospects, hut if they don't do it capitalists will not look at them at all, and often no matter what price is set the man with money wants it for less. For instance, I have now a prospect that a good many thousand dollars have been taken from. The ore from the chute, which is 100 feet long, has averaged $20 per ton. The mine looks as good as it ever did, hut if I ask $10.000 for it they want it for $5000. If I ask $5000, they offer $3000. If I price it at $3000, they think something is the matter with it, and if I offer it for $1500 they say it can be no good and will not look at it at all. I am, therefore, ahout changing my mind in regard to prospectors setting too high a price on their property. They have to do it in order to have any one examine it. I have yet to see the man who will offer anything for a property that the owner does not hold at a price above its real value. W. J. CLARK.

Grant's Pass, Or., July 16, 1893.

The West Kootenay Mining Region

The great Columbia river rises in the heart of the Rocky mountains, very clnse to the 50th parallel of latitnde, and runs in a northwesterly direction for a distance of ahout 175 miles, then turning sharply, runs directly south through British Columbia, a distance of nver 200 miles into Washington State, whence it continnes in a southwesterly direction to its home in the Pacific.

The area of mountainous country enclosed in this circular course, running around as It does and enclosing the Selkirk range and its spurs, passing through the two large sheets of water, the Upper and Lower Arrow lakes, and enclosing a conntry containing the great Kootenay lake and more famous Slocan lake and its trihutaries, with the ontlet nf the Kootenay river; the greater part of this large area is now on the map and known tn the mining world as the West Kootenay district of British Columhia.

Since the early days in the 50's, first the placer miner and then the seeker after quartz have pushed their way up the Columhia river and penetrated tn the head of its numerous feeders in search of anything of value in the mineral domain. With more or less success in the attractive search for the yellow metal, the time has rolled around when with the necessary means of transportation in sight, heralded by the huilding of the Canadian Pacific transcontinental railway, which crosses the northern part of the district, the huilding of which line attracted prospectors from all sections, ever ready to try a new field, and at the same time educated a number of men who found themselves in the country and took to prospecting, which has that alluring feature, the chance of finding the means to a fortnne or at least the acquirement of sufficient capital to raise them from that level—a hand-to-mouth existence. And a large percentage of those who have horne the heat and burden, the cold, rain and privations of the last few years; who have succeeded in gaining a grasp of the almighty dollar, is a very suhstantial and satisfactory proof of the wealth of mineral in this district. Considering the large area, the past inaccessihility of the country, the rugged, heavily-timbered character of its mountains, the cost of supplies, with the distance from and difficulty of attracting capital, the results have heen more than gratifying.

On the 9th of July, 1887, three locations were made, called the Kootenay Bonanza, Silver King and American Flag, hy a party of prospectors named Hall; situated on Toad mountain, on the divide hetween Cottonwood creek and Salmon rlver. This started what has heen since known as the "Toad Mountain Camp," and these three claims are now of world-wide reputation, known as the Silver King mine with a copper-silver hearing ore of high grade, which the owners have lately stocked on the London market for $2,000,000, after having done considerahle development work, sufficient to lay bare a mass of ore which gives suhstantial proof that this mine may soon he one of the hest producers on the continent.

The excitement following the discovery of the rich surface indications hy the Halls led to a rush into this section, where 300 locations were made in .this one mineral belt within a radius of a few miles and within six miles of the shores of the west arm of Kootenay lake, where the town of Nelson was staked off and started as a government headquarters for the dlstrict, which it has remained ever since.

On the large Kootenay lake, some 25 miles from Nelson, the existence of silver-hearing ore was known to the employes of the Hudson Bay Company as far back as 1825, when they had traders on these waters, and 40 years later, when placer miners penetrated this section, they carried away the knowledge of having seen silver-hearing ledges, and this knowledge bore fruit in 1883, when the Canadian Pacific railway was heading across the mountains, when prospectors spread over the country and a numher of silver-lead prospects were located around the shores of Kootenay lake, more or less of a medium grade, and a camp was started at a point called Ainsworth on the west shores of Kootenay lake. The value of these ores depended entirely upon cheap means of transportation, and their discovery did not create the stir that the richer ores of the Silver King did a few years later.

In 1889 a charter was granted to the Columbia & Kootenay Railway Company to connect the navigahle waters of the Columhia river (which extended from the crossing of that stream by the Canadian Pacific railway in the north to the international boundary, and then southward a total distance of over 200 miles) with those of the Kootenay river and lake. The course of this river was from a point at the mouth of the Kootenay river where it entered the Columbia (some 30 miles north of the boundary line), thence following the rapid and picturesque Kootenay to the smooth waters of the arm of Kootenay lake, a distance of 28 miles.

Construction was immediately commenced, and in 18 months trains were running from Robson, the Columbia river terminus (where connection was made hy large, stern-wheel river steamboats with Revelstoke), and Nelson, the Kootenay lake terminus and center of the district. Thls communication gave a great impetus to this section, and groups of mines were discovered throughout the district. The excellent fishing and superh scenery of these inland waters attracted tourists from all parts, who carried away with them the impression that the country possessed immense hidden wealth, and that, given time and capital, these sllent mountain valleys, which nature had molded with such a free and unstinted hand, by a grand compilation of her foundation material thrown up in such fantastic and rugged array, to surpass, if not in height at least in variety, her best efforts.

The fame of the Kootenay country traveled abroad, and the representatives of mlnlng capitalists visited the section, and more or less money was invested in development up to the fall of 1891, when, in Octoher of that year, a party of prospectors came from the divide between the mountains on the west side of Kootenay lake, at the head of Kaslo creek and Slocan lake. They brought back with them wonderful specimens of argentiferous galena running up into the hundreds of ounces per ton. This startled the whole mining population, and although late in the season, a stampede was made for the districts; a race for mines, townsites and land. Very little was accomplished as the season was so far advanced, hut the specimens were so rich and the ledges so large that the news spread like wildfire, and was carried all over the adjolning States; and hy the spring prospectors and miners came in from all directinns waiting for the snow to disappear.

The result of the prospecting of the season of 1892 proved the richness of the district, and some 900 prospects were located on the Kaslo Slocan mountains, amnng these such prospects as the Washington, Freddie Lee, Mountain Chief, Slocan Star, Slocan Boy, Big Bertha, Ruscan, Lucky Jim, Bluehird, and Lucky Boy.

Mining men frnm Montana and Colorado came in and looked over the couotry, and properties changed hands as mere "prospects" at hig figures. The richness of the ore was such that few mining men who had not seen the camp could he lead to helieve it, hut the rapid advancement of the country and the continued evidence of men who had visited the mines, together wlth the ore itself, hrought men from all parts. By the fall of 1892 ore was heing shipped, ohtained from the mere development work, and was of such a uniformly high-grade character that, after paying the heavy expenses of packing, it yielded a handsome profit; and some shipments of ore from this section are said to he the richest ever ohtained at a smelter. The result of this work was the springing up of the town of Kaslo, on Kootenay lake, which grew in eight months from a few shanties to a town of 2000 inhahitants.

The fall of 1892 hrought in a numher of new strikes throughout the district. Ledges reported in the Lardeau country at the head of Kootenay lake, of large size; and the report of another rich area similar to the Slocan, hrought in nearly all the prospectors from the Cœur d'Alenes, and the results of the summer of 1893 will, without douht, show up new camps.

The gold prospects of the Salmon river country, now heing opened up hy the huilding of the Nelson & Fort Shepherd railway, givlng direct communication with Spokane, are awakening a keen interest, and those who have heen over this section are of the oplnion that there is a large area of gold-producing country extending, as it does, from the Knotenay river to the Pend D'Oreille river.

Numerous prospects already found go to prove the richness of this section. A large placer claim is heing worked this summer on the Pend D'Oreille, which promises big returns, and other ground will he opened up this season after being thoroughly prospected and tested.

Altogether, capital amounting to $100,000 has been invested in these enterprises. Gold which has heen known to exist ln the Duncan rlver, a tributary of the Lardeu, is also drawing attention; and a number of prospects have been discovered, and also some placer ground.

The easy and comfortable means of access, the good accommodations to he found throughout the district, and the large and comfortable steamhoats plying on the lakes, make the section one of the most attractive for not only the mining man hut the tourist. The huilding of good roads hrings some of the grandest scenery within easy reach; larger and finer glaciers can he found, surpassing those in Europe, to see which so many travel thousands of miles, regardless of what is within easy reach on their own continent; together with fishing and hunting not to be found in the Old World. Carihoo, bear, goats and deer are to be found in large quantities on the tributaries of the Kootenay lake.—Spokane Miner.

Mineral Wax.

I notice an account and inquiry in *Science* of June 16th in regard to the receipt at the National Museum of specimens of natural wax coming from Portland, Oregon, derived from the shore of the Columbia river, and from other accounts it is found along the coast from the Columbia river to Puget sound.

The material has heen well known for the past half-century as mineral wax, native paraffin, ozokerite, and lastly as ozocerite, a hydro-carhon compound (hydrogen 15 per cent, carhon 85 per cent—varlable), supposed to be derived from hituminous and lignite coal formation by infiltration and crystallization. It is generally found *in situ* in the neighborhood of coal and lignite beds and in the bituminous clays or shales.

The legend as to its heing derived from a wreck is a most absurd one. It is a resinous wax in consistency and translucency, with structure sometimes foliated; color hrown or yellowish-brown by transmitted light; leek green hy reflected light; odor, aromatic, in specimens that I have examined, having the characteristics and feeling of beeswax that had been lying for some time in water.

It is mined in variahle quantities in Germany, Austria, Turkey and England, associated with the soft coal and lignite beds.

In Galicia alone about 30,000 tons have heeo mined since its discovery there in 1859. It is used in Europe principally in the manufacture of candles and hy refining in place of heeswax and paraffin. It is said to he an excellent electrical insulator.

In the United States it is mined *in situ* at Soldiers' Summit, Uintah county, and in Emery county, Utah. Sixty-five thousand pounds were marketed in 1888, with a yearly increasing output. The whole product of the United States in 1890, including the Oregon find, reached 350,000 pounds.

The imports of mineral wax, ozocerite, under the names of bay or myrtle, Brazilian and Chinese wax, in 1890 were over one and a half million pounds.

It has heen found *in situ* in thin seams in the lignite beds of Oregon, Washington and British Columbla. The deposits along the Columbia river and on the sea-shore of Oregon are no doubt the debris from lignite beds near by.—C. D. Hlscox, in Science.

The Economic Side of Electric Railways

A great deal of ill-directed iogenuity has heen devoted to showing that snch and such plans can he carried into effect, says the *Railway World*. Men have dehated whether engineering or climatic difficulties were insuperahle. There are few difficulties which can he termed lnsuperahle. But many enterprises which are practicahle are not likely to be profitahle. It is practicahle to establish a nniversity ln a region densely illiterate, hut lt might be argued that a few common schools would exert a more heneficial influence upon the community. The desire to build railways in order to attract settlement, to develop sections in advance of present needs, to erect a dozen houses for one tenant, has often manifested itself among our countrymen. While great benefits have sometlmes resulted from this progressive spirit, heavy losses have heen the inevitahle consequence of stagnant capital. Large sums have heen locked up in unprofitahle investments. Expansion has given way to retrenchment. Overprnduction has thrown industrious men into the ranks of the nnemployed. Every husiness man has seen instances of this, and yet the impulse tn move more rapidly than is consisteot with prudence, though occasionally checked, ls not cured.

The friends of electric railways seem to he pushing their pet improvement forward at a high rate of speed. It has heen shown that electricity can give the necessary power for transportation. At present, the power sometimes ceases, just when the car is in a dangerous position, and sometimes hreaks away frnm all control, and carries the vehicle forward at a rate more perilous than pleasant. Still electric transportation is a recognized force, and may he rendered more convenient and less dangerous in the future. The eulogists of the electric system apparently overlook the financial difficulties in the way of the success of their plan. Between a great city and a country village there is a marked difference. A city must furnish a large volume of passenger trafic. Many people live at such a distance from their places of husiness that walking would he out of the question. From their doors or from the nearest corners they hoard the cars, and are carried hack again in the evenlog. The street car companies of various municipalities have packed their passengers closely together in rolling stock of an inferior character, and have earned large dlvidends. Operation has been far less expenslve than in the case of steam railways, and gains have heen materially larger. There does not seem to he any good reason why electric railways in crowded cities should not he as profitahle as horse car lines and cahle lines have heen. Undouhtedly it would he foolish to minimize their importance.

But if the icicles melt in the sunlight, the figures hy which it is sought to prove that rural electric lines will earn rich dividends melt away under examination. A traveler glancing from a car window notices, or should notice, how few people are to he seen in the country hy comparison with those in a built-up street. The village with one long street and a few straggling lanes would not make a fair-sized ward for a city of the third class. A hasty survey of the railway stations, the stores, the schools, and the churches along the line might show that the population was only a fractional part of that to be found in great centers. Fields and woods take the place of crowded streets, and houses, instead of heing contlguous, are often separated hy several hundred yards or greater distances. Yet facts apparently visihle to the most careless observer are neglected by those who have caught the electric fever. If electric lines are paying investments in the cities, they must, so it is hastily concluded, he profitable in the country. No one would reverse this line of reasoning and conclude that hecause money can be made hy raising sweet potatoes in the country that occupation would be gainful in the hack yards of town residences. Yet, logically considered, there is little to choose between the two fallacies. Electric lines might easily pay where there are thousands of daily travelers, and fail to pay where travelers are few in numher.

While the difference in population hetween a city and an agricultural district is great, the difference in traveling population is still more noticeable. A large proportion of men and women in cities must ride daily from their homes to their places of business and back again. In country districts a large percentage of the population rarely finds it necessary to enter any vehicle except a wagon. Their occupation is such that it can be followed without buying tickets or monthly books. A factory operative may have to reckon car fare among the necessary expenses of life, while a farm hand may look on riding as an occasional luxury, only to he indulged in during the time of the country fair or the circus. There are farmers of considerahle wealth who spend very little money for traveling, and indeed have no occasion to do so. Wlth stables well filled wlth horses, and habituated from hoyhood to drivlng, they prefer to use their own teams on their journeys to the store, the polling place, or the dwelling of a kinsman. The constant though trifling outlays for transportatlon to which city people are accustomed is not agreeahle to the farmer, nor is it likely that he will ahandon the life-long hahit of driving merely because an electric line has heen built in the neighborhood. Whatever farmers may or may not do, they are not apt to change their long-established customs merely to oblige corporations.

Should electric lines he constructed through regions heretofore unprovided with any transportation facilities, except those of steam lines, many would from curlosity desire to ride in the new cars. This desire, however, would soon decline. It must be remembered that many who would enjoy a short ride in an electric car would be decidedly adverse to a jaunt of from 25 to 50 miles in such a conveyance, when a locomotive would make the trip in from one-half to one-third the time. When the electric cars are safe, they are slow. When they are fast, they are dangerous. Choosing either horn of the dilemma, the prospect is not flattering to those who have sung the praises of electric lines to connect distant cities. People can, no douht, ride 100 miles in an electric car; hut will they do so? Unless the national character alters, and to a desire to

reach the journey's end succeeds a wish to dawdle along the road, they will not. The electric car is, beyond question, a convenience to the man who has missed his train, but its availability for long rides when steam navigation is accessible is quite another matter. A road might pick up a fair amount of two-mile business, and yet find that 20-mile business did not materialize. Such views may not be progressive, but they are worthy of consideration. With the collapse of the narrow-gauge movement in one's mind, it is well to pause before accepting the predictions of brilliant success on the part of electric lines.

Possible litigation and other difficulties may yet increase the expense to which electric lines are to be subjected. At all events, the great profits have not yet been earned. It is easy to point out how grandly electrical science is developing, and how the remotest hamlets will be revolutionized by the new system that is to bind townships and counties in harmonious fetters. There is plenty of rhetoric on the side of the electric lines, but there are sundry economic reasons for doubting whether their triumph will be as overwhelming as has been claimed. From time immemorial it has been recognized that there is a difference between town and country, and the champions of electric railways seem to base their hopes on estimates ignoring this distinction.

The World's Gold and Silver.

At this time it may be interesting to glance at the production of gold and silver throughout the world during the past 20 years. In the quinquennial period embraced between 1871 and 1875 inclusive, the aggregate production of silver was 295,882,327 oz. In the next quinquennial period, between 1876 and 1880 inclusive, the output rose to 356,135,053 oz, and in the next five years it advanced to 437,907,539 oz. Between 1886 and 1890 inclusive, there was a further advance to 557,551,745 oz. The production of 1891 was 140,835,902 oz., while that of 1892 was 139,733,936 oz. It will be seen that there has been an extraordinary increase in the production during the past 22 years, and this has led to a gradual decline in the value of the ore raised. For the quinquennial period between 1871 and 1875 inclusive, this value was 78,608,483*l.*; in the next five years, 94,616,114*l.*; in the next five years, 116,338,643*l.*, and in the next five years, 148,127,453*l.* It will be seen on reference to the figures previously given that while the increase in the production was nearly 88 per cent, the increase in the value was only about 50 per cent. It is in the United States and Mexico that the production of silver has made the greatest progress during the last 22 years. Between 1871 and 1876 inclusive, the American output of silver was 121,262,248 oz.; in the next five years the production advanced to 157,622,000 oz.; in the next five years to 182,900,000 oz, and in the next five years to 230,980,000 oz. The production of 1891 was estimated at 58,000,000 oz. The Mexican silver output was 98,289,915 oz. between 1871 and 1875 inclusive; 98,433,240 oz. between 1876 and 1880 inclusive; 124,002,584 oz. between 1881 and 1885 inclusive; 150,519,519 oz. between 1886 and 1890 inclusive. The production of 1891 was 34,838,348 oz., while that of 1892 was 37,006,382 oz. The production of silver is increasing in importance in Australasia, but is still a long way behind that of Mexico or the United States. The substantial fact certainly remains that as the production of silver has increased, the intrinsic value of the ore raised has declined. The production throughout the world has remained practically stationary. In the five years between 1871 and 1875 inclusive, gold was raised to the extent of 28,026,514 oz.; in the next five years to the extent of 26,349,054 oz.; in the next five years to the extent of 24,567,749 oz., and in the next five years to the extent of 27,030,438 oz. The output of 1891 was 6,005,189 oz., while that of 1892 was 6,615,611 oz. The value has, of course, corresponded to the output, having been 119 051,026*l.* in the five years between 1871 and 1875 inclusive; 111,925,510*l.* between 1876 and 1880 inclusive; 104,358,883*l.* between 1881 and 1885 inclusive, and 114,819 893*l.* between 1886 and 1890 inclusive. The value of the output in 1891 was 25,711,232*l.* and that of 1892, 28,101,792*l.* The production of gold in Australasia between 1871 and 1875 inclusive, amounted to 10,533,131 oz.; between 1876 and 1880 inclusive, to 7,526,912 oz.; between 1881 to 1885 inclusive, to 6,909,642 oz.; between 1886 and 1890 inclusive, to 6,885,653 oz.; in 1891, to 1,470,585 oz. and in 1892, to 1,550,000 oz. The United States produced 9,475,723 oz. of gold between 1871 and 1875 inclusive; 9,530,510 oz. between 1876 and 1880 inclusive; 7,730,324 oz. between 1881 and 1885 inclusive; 8,070,221 oz. between 1886 and 1890 inclusive; 1,604,840 oz. in 1891; 1,650,000 in 1892. The gold production of Russia is not without importance, but is sensibly smaller than that of the United States.—American Manufacturer.

Gold Yield of New South Wales.

The gold returos of New Sonth Wales for the last 40 years or so are given in the annual report of the Minister for Mines and Agriculture, which has just come to hand, and the figures are well worthy of attention. The returns show at a glance the remarkable ups and downs of the gold-mining industry of the colony from the year 1851, when gold was first discovered, down to last year, and, although the figures for the last half of the period are considerably below those of the first 20 years, they are not without some gratifying and hopeful features. The colony started off in 1851 with a total output of 144,120 ounces—a very fair thing for a maiden effort—and rose by a gigantic leap in the following year to 818,751 ounces, which to this day constitutes the record. In 1853, the output was 548,052 ounces, but fell next year to 237,910 ounces, going still lower to 171,367 ounces in 1855. Low ebb totals prevailed for a year or two, and things again brightened up, for the figures rose from 175,949 ounces in 1857 to 640,622 ounces in 1862. The down grade was again entered upon until the figures fell away in 1870 to 240,858 ounces, only to rise again in 1871 to 323,609 ounces, and in 1872 to 425,129 ounces. This, however, was the last real spurt, and from 361,784 ounces in 1873 the totals got down to 109,649 ounces in 1879, and, with slight fluctuations, kept down till 1888, when the lowest point in the history of gold-mining was reached, the total yield being only 87,503 ounces. The year 1889 showed a great improvement with 119,759 ounces; 1890 was better with 127,760 ounces, and the last two years were still more satisfactory with 153,336 ounces for 1891 and 156,870 ounces for 1892. The total amount of gold produced in New South Wales to the end of 1892 was 10,530,322 ounces, valued at £39,202,655 15s. 2d.

Geology of Building Stones.

Of interesting sciences there are none more so than geology—the study of the earth. The material substances about us, the handwriting of Dame Nature, is by the power of human reasoning made to reveal the secrets of the past. With this mighty weapon knowledge is well armed in the constant conflict with tradition, superstition and falsehood.

But there is to be found in this great historical warehouse one chapter that reaches its usefulness out to us in our every-day life and adds an interest to what may at first seem to be things of the commonplace.

I will say "stones for building." To the layman this conveys little more than the idea of a block of hard material that has proved a very useful thing with which to construct a habitation. To the architect it conveys a feeling of pleasure, a friend of great possibilities, while to the mason it is the staff, the rib of his existence; but to the geologist the words are of significance—the rib of the world. Of these, which is the more exalted? Let us listen to the geologist. With pleasure, if he will drop the isms and asms of the technical.

Order is one of the first and best laws of nature. The geologists are orderly, or nothing. Thus they began a classification in the earliest stages of their investigation of the earth's rocks. In this first arrangement, such rocks as were supposed to have been original in their formation were called primitive, and such as were composed by the disintegration of others were called secondary. In the primitive rocks there are never found the remains of organic substances, as shells or plants, from which fact we infer that they were formed prior to the existence of life in any form. On the other hand, the secondary class often contained fossils of all kinds, and portions of what must at one time have been primitive rocks. But these early scientists were entirely too simple in their nomenclature for the modern schools. Since that time the latter have been busily engaged in inventing new names and championing them abroad after their invention.

For the use of the laymen, however, an easy classification of rocks is as follows: 1. Primary. 2. Transition or intermediate. 3. Secondary, (*a*) lower secondary series, (*b*) upper secondary series. 4. Tertiary. 5. Basaltic and volcanic. 6. Diluvic and alluvial.

Before taking these up, I should not forget to mention what a rock is.

"Oh, everybody knows what a rock is."

All right, then, what is it?

"A rock is a—a—rock."

I thought so too. A rock is an aggregation of minerals occupying a definite position in the earth's structure. It could be one mineral as well as more than one, but as a matter of fact the pure mineral is never found.

The primary rocks are the ground work of the globe; they are the ribs of the world. They rise into lofty mountains and are the floor beneath which we have never penetrated. One of the most notable of these rocks is granite; I might better say granites, for the number of kinds is legion. However, the differences are very small, indeed, being more in what are really impurities than anything else. The usual three minerals are found in them all, quartz, feldspar and mica. Quartz is a white, glassy substance that breaks in an irregular manner. You have often broken the smooth white pebble that so abounds wherever there is running water. Ten chances to one that pebble is quartz. It is the mica in granite that sparkles so. The bits are small sheets or leaves, very small indeed, but still abundant enough to give the greenish tint so often noticed. Large pieces of this same mica is called isinglass and is certainly familiar.

Other primary rocks are gneiss (pronounced like the word nice), mica slate, clay slate, primitive limestone, porphyry and syenite. They are all, as a rule, crystalline in their structure and never contain remains of organized substances or portions of other stones. By organized substances we mean living things, as plants and animals.

Gneiss and mica slate are composed of the same materials or minerals as the granites, only arranged somewhat differently. The grains are, as a rule, very much smaller than in the granite. In gneiss the quartz and feldspar are very closely aggregated, while the mica is arranged in scales between strata of the same; hence it is that gneiss is really a stratified rock, and if a section or break be made at right angles to the strata it will present a striped appearance, for the quartz and the feldspar are nearly white and the mica a narrow band of green. Often the mica is a deep black.

Mica slate is composed principally of quartz and mica and a very small portion of feldspar. The latter is sometimes all but absent. The quartz is commonly in the form of fine sand and the mica in flakes. The latter predominates, and sometimes seems to be the entire composition of the rock. Mica slate differs from gneiss in having such a small portion of feldspar, and more in the positive stratification, which is so marked that it is easily separated by wedges into plates or layers. An example of the latter quality is found in the common flagstone.

These three stones—granite, gneiss and mica slate—form what is known as the granite group, and together they form the major portion of the earth's crust. The gneiss is intermediate between granite and mica slate in its structure, and is often found between these rocks, lying over the former and under the latter. Sometimes the transition is so gradual as to be hardly perceptible, the granite growing to a stratified gneiss, and the latter as slowly into fissile mica slate.—Edward C. Weaver in Stone.

Cornish Mines and the Royalties They Pay.

It is with great regret we see the startling figures that have been recently published showing that as between 1890 and 1893 the market value of Cornish mines has decreased by no less an amount than 1,210,000*l.* If the occasion required, we could produce figures to show the marvelous advance in value of these shares within a similarly selected period. Our experience of Cornish mine quotations has been this: That, probably, for a series of years, say five or six, and even up to ten, they have gradually declined in value almost month by month, and then there has been a sudden revival of the spirit of speculation, or there has been a big rise in the price of tin, whereupon, heigh presto! Cornish shares have bounded upward and the world has marveled. Several of these rapid changes have occurred within our memory. At the present time Cornish mines appear to have reached the Nadir of quotations, and old experts, with wisdom to discern the signs of the times, will probably think them more worthy of attention at a moment like this than when they have had one of those sudden rebounds to high prices, in which this section of the market is so prolific. There are some of the shares in the list that are absurdly below their value. For example, if Carn Breas were worth 68*l.* in a time of inflation, surely, with much more development work done and better prospects, they must now be worth more than 12*l.* The fall in market value of this mine alone is 366,000*l.* Tincroft, near its neighbor, has fallen from 33*l.* to 12*l.*, but surely the real value of the shares if then lower than the higher price is now higher than the lower price. Take, for example, Wheal Grenville, quoted at 18*l.* in 1890 and at 15*l.* in 1893. Why? The value of the mine at the two dates almost defies comparison. In 1890 the committee were only contemplating the reopening of the eastern section, and the raising of capital for the purpose, whereas in 1893 the capital has been raised and the work has been accomplished, with a measure of success beyond the most sanguine hopes at first entertained. Will any man in his senses say that Wheal Grenville shares are intrinsically worth 3*l.* less today than they were in 1890? We speak as unto wise men.

While on this subject we have lately been at pains to collect a list of the royalties paid by the leading mines of Cornwall, with the following results: Levant pays 1-24th dues on tin and 1-20th on copper, with the usual water charges. Botallack has not paid dues for some years, but, if making profits, would probably pay at the same rate as Levant. South Wheal Frances pays a small amount in dues to Mr. St. Aubyn on tin raised from Grilb's estate; it is 1-120th, and last year amounted to 59*l.* 15s. 1d. West Wheal Frances pays 1-24th, South Condurrow 1 48th, Cook's Kitchen 1-15th, New Cook's Kitchen 1-15th, Wheal Kitty 1-60th, Prince of Wales 1-18th, by lease, but the company is now only paying one per cent, or about 38*l.* a year. Wheal Metal and Flow pays 1-16th from the Flow and 1-30th from tin broken underground. Wheal Uny was paying nothing at the time of its suspension, and a similar remark would apply to Wheal Crehor. East Blue hills has not paid any royalties for 10 years or more. West Kitty pays 1-18th on 5-6ths of the property and 1-20th on about the other 6th. No royalty is being paid by Wheal Friendly, as the mine is not productive, but when it is the lease provides for a royalty of 1-18th, and Polberro pays 1-20th. Carn Brea pays 1-18th on gross returns, Tincroft 1-40th up to 55*l.* per ton for tin and 1-24th above. Dolcoath pays 1-18th and East Pool the same on tin and 1-15th on copper. Killifreth (the only mine in the county whose shares show improvement on a three-years' retrospect) pays 1-4th for three years and then 1-25th, provided the new engine be working within 15 months from date of the new lease. West Frances pays 1-24th. Wheal Agar has paid no dues of some time, but last year paid 1-120th, and of Wheal Agar and Wheal Bassett a similar remark may be made. These payments are, of course, subject to frequent change, but, as given above, they practically form a sound basis for argument and for information.—London Mining World.

Can Destroy Logging Streams.

Mealy-Lacy Company, of Chehalis, Washington, recently closed up a law suit in the Superior Court of Lewis county in which the ruling of the court seems hardly fair for the mill company, no matter how legal it may be. The case is of interest to lumbermen who depend on the smaller streams of the State to carry their logs to mill. The case was prosecuted by the mill company above to ascertain whether or not the statutes would protect streams by preventing farmers and others from using them as dumping places for brush, stumps and logs. The temptation to use the streams for this purpose is evident to any one who ever cleared up a farm. It is an old custom, apparently having been adopted by the first settlers.

The testimony proved conclusively that the defendant had obstructed the stream, in fact neither the defendant nor his witnesses denied the fact, but they claimed that the logs, which had fallen into the streams, had been cut up into short lengths, so they would float out in high water.

The defendant claimed that in clearing the adjacent land it was not possible to prevent the trees falling into the stream. It was proven by the mill company that the stream had been used for log driving for a distance of ten miles above the point obstructed. It was also shown that the obstruction had been in the stream for over two weeks previous to the filing of the complaint. The court instructed the jury that if they found from the testimony that the obstruction was not maliciously placed, to acquit the defendant.

The jury brought in a verdict acquitting him. If this case stands it is evident that any of the logging streams in the State are liable to be ruined for logging, as it will always be a difficult thing to prove work of this character malicious. This case should go to the Supreme Court, and if not reversed, the statute should be so amended that all logging streams in the State will be fully protected.—West Coast Lumberman.

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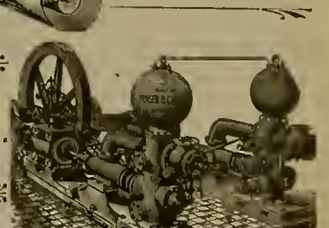

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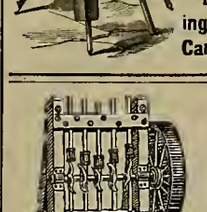

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Mechanical Progress.

An Important Armor-Plate Test.

On Tuesday last the third of a series of very interesting armor-plate tests took place at the naval grounds 20 miles south of Washington City, on the Potomac river, says the *American Manufacturer*. The tests were for acceptance and for premium, it having been stipulated that if the plates resisted penetration under a certain prescribed velocity, the makers should receive a premium of $30 to a ton, in addition to the contract price of $575 a ton.

Two plates were tested. The first was a 9-inch plate, 6 feet and 4 inches wide and 9 feet 7 inches long, nickel steel, made by the Carnegie Steel Company of Pittsburg. Three Holtzer projectiles weighing 250 pounds each were fired against it from an 8-inch rifle, the muzzle being 58 feet from the face of the target. The first projectile had a velocity of 1400 feet a second at the moment of impact, and penetrated the plate and oak packing to a depth of 11.7 inches. The second projectile, with a striking velocity of 1683 feet, went through the plate, three feet of oak backing, and lost itself in the earth against which the butt was built. The third projectile had a velocity of 1536 feet, and penetrated plate and backing to a depth of 14½ inches.

The plate well withstood the strain of the attack, no cracks being perceptible, and it fully met every requirement for acceptance, but the result of the second shot deprived the makers of any chance for the premium.

The test of the second plate was an exact duplicate of the first in its results. It was a sample of the curved plates for the barbette on the Indiana, made by the Bethlehem, Pa., company, and like the first of nickel steel. Its dimensions were 8 feet 4 inches in height, 12 feet 1 inch in length and 17 inches thick, forming a mass weighing 31½ tons. It was the heaviest plate yet tested. It was subjected to attack from a 12-inch rifle, which threw a monster Carpenter shell weighing 850 pounds. Its muzzle was 319 feet from the face of the plate. The striking velocity of the first shot was 1322 feet a second and it penetrated to a depth of 16.6 inches, lacking less than one-half an inch of going through. The second shot was fired with a velocity of 1495 feet a second and went 3 inches into the oak backing.

The third and last shot was to determine whether or not the premium was to be paid, and the velocity was raised to 1858 feet a second. When the smoke and dust following the discharge had lifted, it was found that the shell had gone clear through the plate and 36 inches of oak backing, and then, finding the embankment rather thin, it disappeared and was not recovered. The plate secured for its makers the acceptance of the whole contract, amounting to from 500 to 700 tons, but earned no premium. Like the Monadnock plate it showed no cracks under the terrific strain to which it had been subjected.

Even more satisfactory than the showing made by the plates was that of the projectiles. The 8-inch shells were of the Holtzer conical pattern, and the 12-inch of the Carpenter conical pattern. Four of the shells that were recovered appeared wholly unchanged, and the gauge showed that they were disturbed to such a small degree that they might again be fired with the attachment of a new strip of rifling.

Some idea of the force with which the shells struck the face of the plates may be gained from the fact that the energy of the last shot fired was equivalent to the force necessary to move a mass of 21,600 tons through one-foot of space.

A Steel 150-ton Pillar Crane.

A 150-ton crane has been placed on Finnieston Quay, in Glasgow, and officially tested by lifting a load of 150 tons of steel rails 20 feet high and making a complete revolution with this load. This steam pillar crane was built by Cowans, Sheldon & Co. of Carlisle. The framing, shafting and jib are made of mild steel; the gearing is generally cast steel and the rollers and pathway are of the latter metal.

The center is a casting of nine tons held down by six steel bolts, each 38 feet 9 inches long and 5 inches in diameter. The six washer plates are each 6 feet square, and are built into the masonry of the seat at a depth of 30 feet. In this center casting is the 17-inch center pin weighing six tons. The diameter of the roller path is 33 feet, and it weighs 12 tons. In the live roller ring are 75 cast steel rollers, with a maximum diameter of 14 inches and an aggregate weight of 10½ tons. The frame is 27 feet high and weighs 50 tons, and carries a boiler 14x6 feet, weighing six tons.

The jib is made of two tubes each 3 feet 3 inches in diameter at the center and 90 feet long. Including the stays, it weighs 45 tons, and its extreme height above the quay level is 110 feet. The center of the 5½-foot jib head pulleys, for heavy loads, is 100 feet above the quay; for light loads a 2½-foot pulley is used, and the height for this 107½ feet above the quay. The single tension rods are 10x2¾ inches, and the double tension rods 10x1½ inches, and the pins are 8 inches in diameter. In the ballast box are 100 tons of iron and steel punchings, and exclusive of this back balance the crane weighs 270 tons in working order.

The crane has two speeds for heavy lifts, 130 and 60 tons, and two for light loads of 20 and 8 tons, respectively. There are also two speeds for revolving the crane. The lifting and lowering ropes are made of plow steel wire. Eight 2½-inch seven-strand rope take the heavy lifts; the six strands of patent steel are wound around one strand of soft steel, with the outer six taking the strain. The light loads are taken by a double 1¼-inch rope of seven strands, arranged as before, each made of 37 wires .06 in diameter. The gin block for heavy work has four 5¼-foot pulleys and measures 12x7x3 feet, and weighs about 7 tons.

The radius of sweep for heavy lifts is 65 feet, and for light lifts 69 feet 9 inches. In a late test the 60-ton load was lifted at the rate of 8 8 feet per minute and the 130-ton load at 4 feet per minute. A complete revolution was made with the former load in 2 minutes 17 seconds and with the heavier load in 5 minutes. The total cost, including the masonry seat, was a little less than $80,000.—Engineering News.

The New Army Rifle.

Soldiers of the United States Army will be armed, within a few months, with magazine rifles of the Krag-Jorgensen type. This decision was reached about six weeks ago by the Board of Ordnance and Fortification, in session at the Government Building in Jackson Park, Chicago.

The decision is one of considerable importance. It declares in effect that American inventors have not yet made a magazine rifle which can compare with this model of foreign skill. Awaiting only the final approval of the Secretary of War, it will settle at last a controversy which has been raging for more than two years in military circles.

Early in 1891 a special board of army officers was appointed by the War Department to investigate and examine models of magazine rifles and report as to which one seemed best suited to the needs of the United States Army. Magazine rifles of every prominent type were submitted to the board for its examination, and its report, after two years' work, was in favor of the Krag-Jorgensen gun.

American inventors and makers of firearms were, however, not satisfied. They argued that it would be only patriotic to buy the arms for the national army of home manufacturers, and they succeeded in passing through Congress a measure, which was approved Feb. 27, 1893, to the effect that the whole business should be most thoroughly and carefully reviewed by a new board of army officers. The evident meaning of this enactment was to give every possible chance for the American inventor.

In pursuance of the provisions of the above bill, a commission of army officers was duly appointed. It held long sessions in Springfield, Mass., and before it were brought models of magazine rifles by nearly every prominent American inventor. Its report, which was considered by the National Board of Ordnance and Fortification, as above, favors the Krag-Jorgensen gun, and declares that it has been found superior to all weapons of American invention brought to its notice.

A LARGE GIRDER.—The largest girder ever shipped in one piece has recently been received at the new Broad-street station in Philadelphia. It is 58 feet 1 inch long, 10 feet 6 inches in height, and rests on a plate 2 feet 6 inches broad. The Philadelphia Bridge Company, its maker, claims that this giant, weighing 110,780 pounds, is the heaviest and largest steel girder ever turned out complete by any iron works in the United States. The girder is placed across Fifteenth street on the south side of the great station, and is designed to support the weight of the seven stories of brick of the office building on the Market-street front. It was forwarded from the manufactory on two flat cars of 100 tons capacity each. The girder was so large that it could not be constructed within the works at Pottstown, but the work was carried on in a field alongside the iron shops. It took about two weeks to put it together after the steel plates of which it is built were made. It has three webs running through its entire length. When in place over Fifteenth street, it will have a clear span of 56 feet, and will be 36 feet above the sidewalk.

Scientific Progress.

Velocity of the Transmission of the Flame of Firedamp.

The burning produced at one point of a gaseous combustible mixture is transmitted with a velocity depending upon a great many different conditions, *i. e.*, proportions of the gases mixed, the rest or motion of the gaseous mixture, and nearness to solid cold bodies. The French Firedamp Commission, by a number of experiments, tried to determine the influence of these several circumstances, which are intimately connected with the degree of security obtained by lamps.

The velocity of propagation varies, firstly, with the proportion of firedamp contained in the mixture, and it evidently neither reaches a maximum at either of the two extreme limits of combustibility, nor does it correspond, as one might be led to think, to the mixture for complete combustion, but rather to a mixture containing a certain excess of combustible gas. The highest velocity observed has been 1.97 feet per second.

Proportion of $C_2 H_4$ in 100

Vols. of mixture.....	6	8	10	12	14	16
Velocity in feet....	0.13	0.72	1.38	1.97	1.21	0.24

In a mixture containing an excess of oxygen, the substitution of nitrogen for the oxygen which is in excess of that necessary for combustion does not effect the velocity of propagation. Carbolic acid, on the other hand, perceptibly lowers this velocity. The preceding results apply to mixtures at rest, while the velocities are changed entirely when the gaseous masses are in motion during combustion.

Mixtures which at rest give the slowest propagations may become instantaneous, that is to say, truly explosive when they are stirred up at the moment of combustion by a very energetic movement, such as would be produced by a jet of gas escaping at a high velocity into a mass of gas at rest. This is the explanation of explosions of firedamp in mines. If the velocity of propagation never exceeded 1.97 foot per second the mechanical effects would always be nothing and the workmen could escape from the flame.

Precise experiments have never been made upon the velocities thus developed. It is only known that in the laboratory in small tubes 1.18 inches in diameter and 6.56 feet long we can obtain velocities greater than 65.6 feet per second, and it is perhaps by hundreds of feet that the extreme velocity obtained in the explosion of firedamp should be calculated.

The spontaneous movement of gaseous masses during combustion is not an exceptional phenomenon; it is, on the contrary, the rule, and in order to avoid it only partially in laboratory experiments it is necessary to take very special precautions.—American Gaslight Journal.

Iridescent Photographs.

As a matter of fact, there is one sort of color photography which is no longer in any sense a "nebular hypothesis," excepting by reason of popular incredulity and ignorance, says the *Optician*. The process of Lippmann or Raleigh, which is, of course, what we refer to, is, in principle, the most wonderful innovation in photography which has been made since the first invention of that art. The strata of violet iridescence lie at the limit, and those due to the more lengthy stationary waves near to the limit of possible microscopical separation. And thus the realization of this process intimates to us, among other things, how perfect is the control which may be afforded by optical methods over the dispositions of what might be termed molecular mechanism.

It is possible, as has been already intimated, to produce Lippmann's or Raleigh's images in such a manner as that the periodic structure may be correlated, not with the almost infinite range of tints of nature, but with a limited number—say three—which may be described as the equivalent tints of visual color sensation; and we can assert that in this way it would be easy to make a great improvement on the "original" form of the Lippmann process.

The three images could be taken on three several films, and then optically re-combined—most simply, although, of course, in a somewhat imperfect manner, by direct superposition of the films, as in composite photography. The specific courses of procedure which may be adopted are simple enough. Three suitably color-sensitized plates may be exposed, either singly in monochromic lights or together in white light, whether this latter be a physically white light, *i. e.*, a mixture of waves of all lengths, or a trichromic mixture that is merely visually white. Here the efficacy of a dispersive element in the optical system may be pointed out. By the ordinary ground glass of the camera, stereoscopic effect is eliminated, so that it becomes possible to obtain three simultaneous projections of the image, which are alike in all respects, by the employment of three several refracting systems upon the farther side of the ground glass—we mean upon that side which is remote from the principal lens. Other methods for the simultaneous production of the three images may be used, as, for instance, has been shown by Mr. Ives, or as has been described by us.

Such tricolor iridescent photographs as we now refer to would be most advantageously viewed in what we may call a very closely sifted trichromic light; and several different methods by which such light, of nearly definite wave lengths, can be readily sifted out have been already described in our columns. In making the original photographs in light of this kind, there would be no necessity to employ color-screens in connection with the camera, and either a plate having three superposed films, each selectively sensitized for one kind of light, or a single orthochromatic film, as in the present Lippmann process, could be used. In the result we should have a very excellent form of iridescent photo, impressing upon our eyes the equivalent of every possible tint in nature, yet involving absolutely the minimum of complexity of dimorphic structure. Needless to add, the light (if ordinary white light is used) for viewing such photographs should be intense, as only a fraction of it is utilized.

The light which is not utilized in viewing iridescence photographs, or that which in place of being reflected to the eye is transmitted through the film, should be completely absorbed by a black backing. But here it may be remarked that even the simplicity of the above-described processes could be further improved on by sandwiching between the black backing and the stratified film a photograph in pigment representing one of the three visually fundamental hues. Pigment images can be produced of such pure tints that three of them, optically combined, exhibit an almost perfect range of color; and hence, no doubt, with one such image and an iridescent film showing the other two colors, by reason of only two different kinds of stratification, a somewhat similar result could be obtained.

The Bed of the Atlantic.

Proceeding westward from the Irish coast, says the *Nautical Magazine*, the ocean bed deepens very gradually; in fact, for the first 230 miles the gradient is but six feet to the mile. In the next 20 miles, however, the fall is over 9000 feet, and so precipitous is the sudden descent that in many places depths of 1200 to 1600 fathoms are encountered in very close proximity to the 100 fathom line. With the depth of 1800 to 2000 fathoms the sea bed in this part of the Atlantic becomes a slightly undulating plain, whose gradients are so light that they show but little alteration of depth for 1200 miles. The extraordinary flatness of these submarine prairies renders the familiar simile of the basin rather inappropriate. The hollow of the Atlantic is not strictly a basin whose depth increases regularly toward the center; it is rather a saucer or dish-like one, so even is the contour of its bed.

The greatest depth of the Atlantic has been found some 100 miles to the northward of the island of St. Thomas, where soundings of 3875 fathoms were obtained. The seas around Great Britain can hardly be regarded as forming part of the Atlantic hollow. They are rather a part of the platform banks of the European continent which the ocean has overflowed. An elevation of the sea bed 100 fathoms would suffice to lay bare the greatest part of the North Sea and join England to Denmark, Holland, Belgium and France. A deep channel of water would run down the west coast of Norway, and with this the majority of the fiords would be connected. A great part of the Bay of Biscay would disappear, but Spain and Portugal are but little removed form the Atlantic depression. The 100 fathom line approaches very near the west coast, and soundings of 1000 fathoms can be made within 20 miles of Cape St. Vincent, and much greater depths have been sounded at distances but little greater than this from the western shores of the Iberian peninsula.

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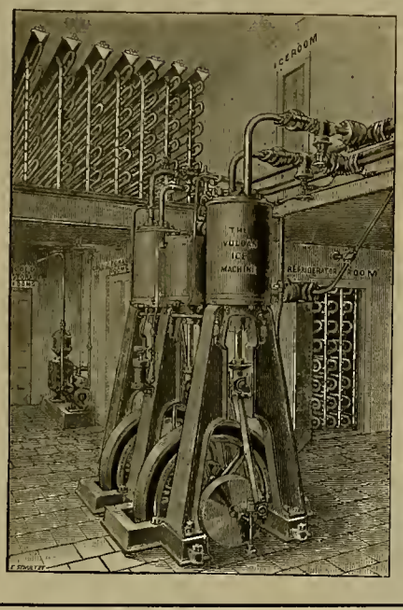

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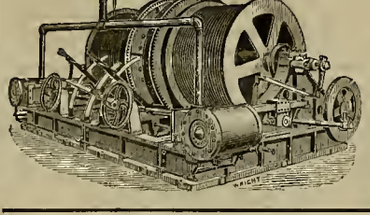
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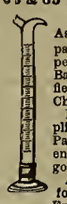
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Electricity.

Electricity in Agriculture.

During the last few years there has been much discussion and not a little experimental work in the application of electricity to agriculture. Interest in this subject was doubtless stimulated by the action of Congress in providing for the establishment of an experimental station in which mechanical apparatus adapted for farm work could be tested in actual operation. As Prof. Shepardson points out in an article on "Electricity in Agriculture," there has been little work of practical value aside from the experiments looking to the application of electrical devices to the operation of farm implements. True, there have been attempts at forcing the growth of vegetables and plants. It has been generally admitted that periods of darkness are not essential to the growth and development of plants. Those who have worked in this field of investigation claim that the electric light promotes assimilation, hastens growth and maturity, intensifies colors of flowers, and sometimes increases their productiveness. The experiments along this line have, nevertheless, led to conflicting and indefinite results. Under some conditions the presence of electric light at night is a great advantage, but in other cases it is detrimental. Currents of electricity have been applied to the soil by many experimenters and in different ways. Lagrange had a number of pointed conductors in the air, connected with a network of galvanized wires buried in the soil. Others have buried plates of zinc and copper, which were connected by an insulated wire so as to form an earth battery. Still others have buried in the ground plates or wires, which were connected with a battery or other source of current. By each of these methods current is sent through the soil and the vegetation in the vicinity is affected, apparently by electrolytic action upon the soil. The results obtained in these ways have been as contradictory as those obtained from the application of static electricity or the electric light. Under some circumstances the current through the soil seems to exert a beneficial effect. In other cases it seems to be detrimental. Lagrange draws the conclusion that current electricity is better for plant cultivation, while static electricity is better for ronts. A number of experimenters conclude that the use of electricity is good for some plants and bad for others. Still others claim it is not only useless, but harmful in every case. Prof. Shepardson concludes that the action of electricity upon plants is like that of certain chemicals upon the human body. In small doses they are helpful stimulants; in large doses they are fatal poisons; or in still larger doses they are less harmful. He summarizes the present state of the art as practically this: "Electricity donbtless has an action upon vegetation, but the conditions for its best application are but little better understood than they were years agn. It is noticeable in the report of all the experiments that no quantitative measurements have been made of the electrical energy developed or applied. In view of the contradictory results obtained from experiments, we are sometimes forced to the conclusion that for most, if not all, plants a certain amonnt of static or cnrrent electricity is valuable. For knowledge further than this there must be carried on, with greater care and intelligence, experiments in which a study may be made of the best methods of applying electricity, and the proper amount to be applied under varlous conditions."—Western Electrician.

Electric Motors for Steam Roads.

In the current issue of the *Railroad Gazette* there is an Interesting article on "Electric Motors for Steam Roads—A Step in Progress," reviewing the problems encountered in the bullding of the electric locomotive illustrated in the *Western Electrician*, April 22d. It will be remembered that this electric locomotive is the heaviest in the world, and it is pronounced by steam engineers to be "the first substantial attempt to put an electric locomotive in the same service as the steam locomotive." It compares favorably with the steam locomotive, and is admitted to be "one of the most interesting machines that has been brought out for a long time." One advantage of the electric locomotive over the steam engine was demonstrated in a test with a steam-switching engine of equal weight. It was a surprise to the steam-locomotive engineer to find that an electric locomotive could pull his engine backward against her own steam pistons with the throttle wide open. The reason attributed is that the steam locomotive, while having equal adhesion, cannot utilize the total adhesion during the entire revolution of the drivers owing to the fact that the turning moment produced by the steam piston varies fully 25 per cent at different points of a revolution, and the maximum turning power cannot exceed the adhesion of the drivers. This leaves the minimum 25 per cent below the adhesion of the drivers, whereas the electric locomotive has a constant turning power and the minimum is therefore greater than the maximum of the locomotive, with the natural result that the electric locomotive can pull the steam engine backward when there is equal weight on the drivers of both. For elevated railway service, such as that given by the Chicago and New York lines, railroad men agree that the electric locomotive is much more economical than the steam engine where anthracite coal is used. The question of repairs for elevated railroad work is an unknown factor, but based on the experience of the intramural road at the World's Fair, it is conceded that the repair account would be very much less with the electric than with the steam locomotive, besides having the advantage of less complication and requiring much less attention while in service. The *Railroad Gazette* says: "To civil and mechanical engineers, as well as to railroad men, the intramural road will probably prove to be one of the most interesting exhibits at the World's Fair, standing, as it does, as a representation of the nearest approach to the substitution of the electric for the steam locomotive in actual daily work."

Electric Railways and Turnpike Companies

Prudent farmers are anxiously considering the dangers to be apprehended from the introduction of the electric roads. They recall to memory many trying adventures experienced before their horses became thoroughly accustomed to the steam cars. Horses, intelligent and tractable as they are by nature, are also remarkably nervous, irritable and easily terrified by unusual sounds and sights. At the first introduction of railroads the tracks were few and the trains infrequent, and the most careful farmers for a considerable period timed their errands of business be the passing of the trains, so as to avoid any direct encounter with the new and terrifying spectacle, until by a gradual course of apprenticeship the wary animals became accustomed to the novel experience. It is remembered that farm-work was also occasionally seriously obstructed by the fact that horses well trained to the plow, and otherwise amenable to the control of the master, could not be employed in the fields near the railroads, as the noise of the trains rendered them utterly unmanageable from terror.

The special apprehension in regard to the introduction of the electric trains arises from the fact that they will be placed upon the turnpikes, which are necessarily the usual lines of communication in rural districts, and must, therefore, immediately involve the horses and cattle in the novel experience. It is also feared that the need of communication will lead to the immediate introduction of so many trains that the disturbance will be much intensified by the incessant repetition of the distressing noises.

By the changes of modern traffic many of these turnpikes, although not far removed from the greater roads, have become mainly the thoroughfares for the quiet country wagon or family carriage, and they cross at grade innumerable pathways, which are little used but by the placid cow and her barefooted driver. Into these quiet conditions the electric train is to be let loose like an unknown and dangerous force, encroaching upon the narrow limits of the road itself, and furnishing no defense which will prevent the bewildered cattle and horses from thrusting themselves madly into the very dangers from which they are striving to escape.

Turnpike companies, by stoutly demanding a sufficient price for the use of their roads, are erecting an obstacle against the introduction of the dreaded invention, and in many cases the farmers hesitate to accept the alluring promises of rapid transit in the well-grounded apprehension of the dangers which must arise from intruding the electric conveyances upon roads long used, and still essential to domestic prosperity for the transmission of farm produce.— Railway World.

Electric Signal Lights.

The use of electric lights in the place of the usual oil signal lamp has been experimented with in one or two places, and proved so satisfactory that the plan has been adopted in the extensive system of interlocking now being introduced at Stewart avenue, Chicago. In the regular plant a small dynamo is necessary for charging the storage batteries to be used in connection with the interlocking system, and while this plant was being installed it was decided to enlarge it sufficiently to supply power for electric lights to be placed on the switch targets. The same wooden boxing used for the wires in connection with interlocking is to carry those for the electric lights. Eighty-five lights are required for the signals, 12 for the signal tower, and 20 for the power-house, making 117 lights in all. The plant used for supplying the current for this work, says the *Railway Review*, must also be capable of charging 30 cells of storage battery used for interlocking, and it was therefore decided to use two Westinghouse 125-volt dynamos with a capacity of 150 lights each. These dynamos are both geared to the same shaft and the power for driving them supplied by two 25-horse power compound Westinghouse engines, so arranged that either dynamo may be driven by either engine. Steam is supplied to the plant by two 75-horse power boilers. The usual form of oil lamp casing will be used and the electric lamp be placed inside, so in case of failure the oil lamp can be substituted. The advantages in the use of electric lights in connection with signaling are evidently great, provided the work can be put in so as to preclude failures, and the experiment will, therefore, be watched with great interest by all signal engineers and others interested in the subject.

Useful Information.

Weight per Square Foot of Sheet Metal.

It will be interesting to those who have anything to do with sheet-iron boiler plate or similar material to have an easily remembered rule for finding the weight per square foot of material they are working with. It has been found by experience that a square foot of iron plate one-eighth inch thick weighed almost exactly five pounds, and this forms a basis for a very simple and easy rule. As a square foot of iron one-eighth inch thick weighs five pounds, a square foot of one-fourth inch iron will weigh ten pounds, and we can say that the area of any sheet iron (or plate iron) in square feet multiplied by the thickness in one-eighths and multiplied by five will give the weight of the piece. There is a piece of tank iron five-sixteenths inch thick, three feet wide and five feet long, how much does it weigh? The area will be 3×5 feet, or 15 square feet. Now, how many eighths is five-sixteenths of an inch? Since one-eighth equals two-sixteenths, and two is contained in five, two and one-half times, we say five-sixteenths equals two and one-half eighths, or two and one-half times five pounds, equals twelve and one-half pounds per square foot, and as there are 15 square feet, we have $15 \times 12\frac{1}{2} = 187.5$. Where the thickness is even eighths of an inch, it is much simpler; but even this is not a hard thing to do as shown. If it is desired to use this rule for other than iron, we simply find the difference between the weights of the two metals per cubic inch and find what a square foot one-eighth inch thick will weigh, then work as shown above. —Ironmonger.

What Zero Means.

The word zero is from the Spanish and means empty, hence nothing. It was first used on a thermometer in 1707 by a young Prussian named Gabric Fahrenheit, then but 19 years of age. From a very small boy he had been a close observer of nature, and in the years mentioned above, while experimenting by putting snow and salt together, found that it produced a degree of cold equal to the coldest day in the year. The young discoverer was struck with the coincidence of his little scientific discovery, and hastily concluded that he had found the lowest degree of temperature known in the world, either natural or artificial.

He called the degree "zero," and constructed a thermometer, or rude weather glass, with a scale graduated up from zero to boiling point, which he numbered 212, and the freezing point 32, because, as he thought, the mercury contracted the thirty-second of its volume on being cooled down from temperature of freezing water to zero, and expanded to the one hundred and eightieth part on being heated from the freezing to the boiling point. Time showed that this arrangement, instead of being truly scientific, was as arbitrary as the division of the bible into verses and chapters. Fahrenheit's thermometer became widely adopted before any one adopted a better scale, and those who now use it cling to it as Englishmen cling to their difficult and cumbersome fractional money. The three countries which use Fahrenheit's scale are England, Holland and America. Russia and Germany use Baumer's, in which the boiling point is counted 80 above freezing, zero. France uses the Centigrade, so called because it marks the boiling point 100 degrees from the freezing point.—Carriage World.

Paving Alleyways.

Philadelphia alleyways are to be hereafter paved with an improved patent pavement when declared defective in paving or drainage. The Board of Health has issued the following specifications for laying such pavements: All alleys five feet or less in width shall be excavated to the depth of 18 inches below the lines given by the surveyor of the district, the excavation thus made to be filled to the depth of 14 inches with clean cinders, well rammed. Upon this shall be laid a concrete, to be composed of one part of imported Portland cement (either of Hilton or Manheimer brand), three parts of clean, sharp, coarse bar sand, thoroughly mixed dry and made into a mortar with the least quantity of water and thoroughly intermixed with broken stone or approved furnace slag, in such quantity that when tamped or rammed solidly in place free mortar will rise to the surface and exhibit a depth of three inches of the said concrete. Upon this concrete foundation a surface shall be laid one inch in thickness, composed of one part of Portland cement (Dyckerhoff or Star Stettin brand) and two parts of crushed granite to pass through a $1\frac{1}{2}$-inch sieve, free of dust, with just sufficient water to make a mortar, to be thoroughly tamped solid to the lines and grade given by the surveyor of the district, and dressed with a small quantity of dryer, composed of one-half pure cement and one-half flint sand, floated over the entire surface as a finish.

Tropical Roofs

The natives of the interior of Ceylon finish walls and roofs with a paste of slaked-lime gluten and alum, which glazes and is so durable that specimens three centuries old are now to be seen. On the Malabar coast the flat bamboo roofs are covered with a mixture of cow-dung, straw and clay. This is a poor conductor of heat, and not only withstands the heavy rains to a remarkable degree, but keeps the huts cool in hot weather. In Sumatra the native women braid a coarse cloth of palm leaves for the edge and top of the roofs. Many of the old Buddhist temples in India and Ceylon had roofs made out of cut-stone blocks, hewed timber and split bamboo poles. Uneven planks, cut from old and dead palm trees—seldom from living young trees—are much used in the Celebes and Philippines. Sharks' skins form the roofs of fishermen in the Andaman Islands. The Malays of Malacca, Sumatra and Java have a roofing of attaps, pieces of palm-leaf wicker-work, about three feet by two in size and an inch thick, which are laid like shingles and are practically waterproof. The Arabs of the East Indies make a durable roof paint of slaked lime, blood and cement. Europeans sometimes use old sails—made proof against water, mold and insects by paraffine and corrosive sublimate—for temporary roofs.

Steam and Electric Railroads.

A writer in the New York *Sun* notes the fact that notwithstanding all the assistance given to corporations by legislatures, cities, counties, and private individuals, railroad construction in this country was very slow at first. In 1830 there were but 23 miles in operation; in 1832, 229 miles; in 1835, 1098; in 1840, 2818; in 1845, 4633, and in 1848, 5997. In no single year was the increase in mileage, which now averages 5000 miles a year, as high as 1000. But from 1849 to the beginning of the civil war, in 1861, the extension was rapid, the total mileage in 1861 reaching 31,000. Then construction languished until 1870, when 7000 miles were added, and now the total length is 215,000 miles. On the other hand, the electric railroads have increased with marvelous rapidity throughout every section of the country. At the beginning of 1890, when electric railroad building first began to be popular, there were 200 companies in operation, covering 1641 miles of track and using 2346 cars. To-day, so great has been the multiplication of lines that there are more than 7000 miles of electric street railroads. Three years ago, the mileage of horse roads was 5713; of electric roads 1641, of steam roads 554, and of cable roads 527. Now the electric roads lead all others.

What the World's Fair Buildings Are Covered With.

Inquiries are often made regarding the material with which the buildings of the Columbian Exposition are covered. This white, incombustible material is "staff."

Not only are the structures clad in staff, but the hundreds of columns, pediments, capitals and all the profuse, general ornamentation, as also the gigantic statuary groups and allegorical pieces, are all of staff.

Without staff, indeed, these enormous buildings would he impossible, at anything like the present cost. One may also say that without staff the Fair in its present aspects could not have come into existence.

This protean substance is a mixture of plaster—often called plaster of Paris—and a small per cent of cement, into which are introduced frequent fibers of hemp, jute, or Sisal grass, to give it toughness, so that it may be bent, sawed, nailed, or bored, at will.

It is cast in molds. The plaster and cement are first wet up to the consistency of thick treacle, a layer of which is spread on the well-lubricated mold. Next follows a layer of the long, tough fibers, over this is poured another coating of the liquid plaster, covering in the fiber and filling the mold to the required depth.

A Unique Way to Save Rails.

The latest practice in economy of rolling stock on railways is to turn the cars at the end of each trip, whereby a large percentage of extra wear and tear is saved, says *Iron Age*. Some years ago a portion of the Wabash railroad was laid with old English iron rails and a small part with steel rails from the Carnegie mills. It became necessary after a time to remove some of the main line rails to another part of the road, and it was observed that, after re-laying them, many gave out immediately, while others manifested no signs of wear. To determine the reason of this apparently unaccountable condition, an investigation was ordered, which showed that the road from which the rails had been removed was built in a northwest-southeast direction, and that in re-laying, a large number had been turned end for end. Those that had not been so placed exhibited no additional loss by attrition, while the turned rails succumbed in from 30 to 90 days. The conclusion arrived at was that the metal had become polarized from long use, when first laid, and that the fiber was broken up by the traffic in the opposite direction. It was further proved that cast-iron wheels generally yielded twice the mileage when the cars were turned at each end of the journey than when they were run backward and forward without reversing. Notwithstanding the value of this discovery, it was not universally utilized, and it is only recently that some of the American railroads have begun to recognize its importance.

NEW SCLEROMETRIC METHOD.—A new method of determining the hardness or friability of substances was described by Herr August Rosiwal at a recent meeting of the Vienna Academy. The measurements consist in comparing the losses of weight sustained by the bodies under investigation by scratching them with a given weight of polishing material mounted on a metallic or glass base until the material loses its efficiency. The polishing materials used were dolomitic sand, emery and pure corundum. The diamond was assigned its place in the scale of hardness by comparing its efficiency as a polishing material with that of corundum. It was found to be 140 times as hard as corundum. Tested by this method, the constituents of Mohs's scale have the following numerical values: Diamond 140,000, corundum 1000, topaz 194, quartz 175, adularia 59.2, apatite 8.0, fluorspar 6.4, calcite 5.6, rocksalt 2.0, and talc 0.04.

FASTENING EMERY PAPER ON WOODEN DISKS.—The following is a simple and practical way of fastening emery paper upon wooden disks or similar objects, says an exchange. Formerly the paper was fastened by means of glue, wax or some other adhesive substance. This involved delay, because the machine could not be used before the glue, etc., had dried, and, besides, the emery paper frequently peeled off when the working of the machine produced a high degree of heat. If the wood is covered with soap, preferably tar soap, without exerting any pressure, the emery paper then placed upon the wood and its working side rolled over a pipe or metal cylinder for the purpose of pressing it down with equal strength in all its parts, the paper will adhere with perfect firmness to the wood and not peel off, even if a very high degree of heat is developed.

TO DRAW RED LINES ON BLUEPRINTS. A correspondent sends the *Engineering News* the following method for producing bright red lines on blueprints. It is not new to many draftsmen, but, as we know from experience that it works beautifully, we print it for the general benefit of our readers: Make a saturated solution of carbonate of soda and add to it enough ordinary carmine writing ink, such as Stafford's or any other good quality, to make a mixture of desired color. Use this with pen, and let it dry without using a blotting paper.

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A NEW petroleum conduit pipe is to be laid alongside the railroad between Baku and Batoum at an estimated cost of 19 millions of roubles. The oil will be hydraulically pumped from the Casplan end into the Batoum reservoirs.

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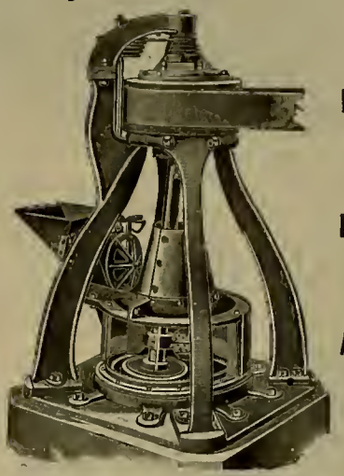

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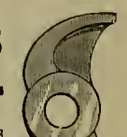

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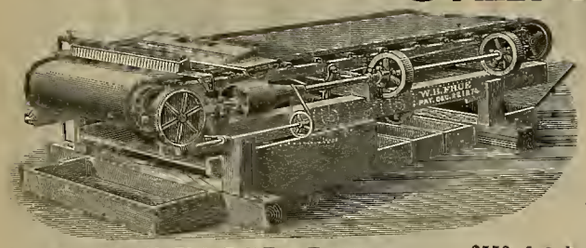

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I am, my Dear Sirs, Yours faithfully,
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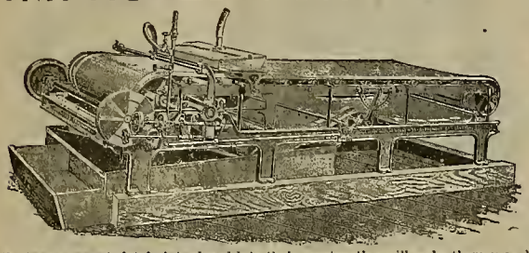

The annexed cut illustrates the **"TRIUMPH" CONCENTRATORS**, and shows the recent improvements which have been introduced into their construction, by which many advantages are gained over any other form of Vanners, Vanning Machines or Concentrators.

These advantages are obtained by reason of the fact, as will be observed, that the crank-shaft is now placed and fitted at the head of the Concentrator, clear of the belt and in direct view of the operator or attendant. This, of course, greatly facilitates the oiling of the bearings of the shaft and connecting rod and precludes the possibility of any sand or detritus, passing over the belt, from reaching or getting into the bearings.

The forms of the bearings and as well of the connecting-rod brasses have also been very much improved, making them stronger, simpler and more easy of adjustment. Important changes have also been made in the feed screw and quadrant for regulating the belt, with the view of making all parts of the machine stronger, more accessible and as easy of regulation as is possible.

We furnish the "TRIUMPH" Concentrators with either the plain or "Blasdel" Riffled Belt and shall be pleased to quote prices with the adaptation of either, as may be requested, and shall further be pleased to show one of the improved form, set up ready for operation, at our office.

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Joshua Hendy Machine Works, No. 51 Fremont St., San Francisco, Cal.—Gentlemen:—Following the testimonial letter which I addressed to you December 9th, 1890, in relation to the superiority of the "Triumph" Concentrators over either the "Frue" Vanners or "Woodbury" Concentrators for concentrating our Texas ores, I hold now to the opinion then expressed; and with nearly two years and a half further experience in their operation I can confidently assert and am more fully convinced than then, that the "Triumph" Concentrators are better in all respects than any other form for concentrating our Texas and Bully Choop ores, and in evidence of such confidence I refer with pleasure to the order recently placed with you for four (4) of the "IMPROVED TRIUMPHS," to make up the complement required for use in the new twenty (20) stamp mill at the "Cleveland Consolidated Mining Co.'s mines in Bully Choop Mining District in Shasta and Trinity Counties, this State, and I feel assured that the improvements lately introduced into their construction will make them even better than the old form which I have had in operation for so many years past in the different mills under my supervision. I am, very truly,

(Signed) R. G. HART, Sr., Manager Texas and Cleveland Cons. Mining Co's.

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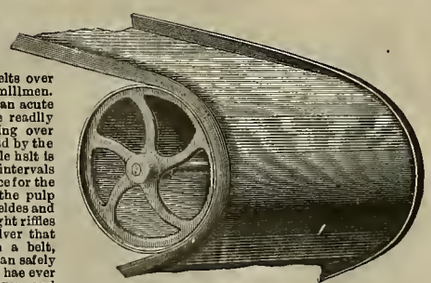

First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers; thus the vexation and loss caused by the frequent breaking of the flanges of the old style belt is practically done away with. Again, our belts, at intervals of two to four feet, have a very slight riffled surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it from banking on the sides and forming channels through the center. These slight riffles also save very fine sulphurets and the quicksilver that would otherwise escape with the tailings from a belt, the surface of which is entirely smooth. We can safely say that it is a better concentrator belt than has ever been manufactured. It will last much longer and will handle more pulp. We also manufacture smooth belts with same flanges when desired.

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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned

CALIFORNIA.

Amador.

PLYMOUTH.—First-class rock is being taken out of the Bay State mine at Plymouth. The next move of the company will be to erect a mill. Dr. Boyson spends considerable time in Plymoutb looking after the mining property which he is engaged in developing. It is understood that the Cliutou mine difficulties will be straightened ont rigbt away. The mill is still running. Snperintendent J. H. Tibbits was over from the Amador mine yesterday. He reports everytbing progressing favorably at the Albany mine and the general mining outlook over in that section as being very promising.

FROM IAMAVILLE.—W. Hipkins has got the new 60-foot gallows frame of tbe Irma frame in place, for whicb be deserves great credit. There are now 60 men employed at the Irma mine, with good prospects of soou doubling that number, as the company have three distinct ledges opened out and appear to meau bnsiness. This company has not beeu in existence one year yet and the mill bas been ronniug already two months ou bigh-grade ore.

AMADOR GOLN MINE.—*Ledger*, Jnly 28: Vincent Neale, representing the Jackson Gold Fields, Limited, which is the snccessor in interest to the Amador Gold Mine, Limited, arrived in Jackson last evening, prepared to redeem the Amador gold mine property, now beld by the Amador Gold Mine (the Americau compsny) upon purchase at Sheriff's sale. The mine and mill is well fortified by armed men, but the complicated condition of affairs will, no doubt, be peacefnlly adjndicated under the direction of the Snperior Conrt and the Sheriff's office. James E. Dye, wbo for several years acted as financial agent of the Amador Gold Mine, Limited, will arrive in Jackson this evening from London to resume his old position.

Calaveras.

DEMARTINE'S MINE.—*Mt. Echo*, Jnly 29: We were sbown some specimens of ore from the DeMartine mine, situated in Bear Mountain, some five or six miles from Angels, that are abont as rich as any qnartz we bave ever seen. The mine from wbich these specimens are taken has been worked off and on for the past 10 or 12 years, and a great deal of money has been taken ont of it. It has been worked for about 600 feet near the surface and prospected well the entire distance. The lead is four and a half feet in width, and grows larger as depth is attained.

THE MOSEA MINING CO.—Calaveras *Chronicle*, Jnly 29: One day this week, in company with W. T. Harris, the general superintendent and manager for this compauy, we paid a visit to the mine, which is now being operated, on Tunnel Ridge about two miles from this place. The mine has now been in operation about seven mouths, and the result of the developments so far made are extremely flattering. The main tunnel, which is 350 feet in length, cnts the ledge at a depth of about 100 feet and shows a fine body of ore about seven feet in width. Five levels have been run np to the present time, the ore enconntered in all of them being of about the same quality and richness. As far as developed the pay chute is now 300 feet in length and dipping towards the north. There is an eight-stamp mill on the mine, run by water power, with a capacity of 20 tons every 24 hours. The mill is supplied with a Heudy rock breaker and an automatic ore feeder. There are also in operation at the mine two of the new Tulloch concentrators. The ore in the mine will average about $6 per ton, while the sulphurets will go as high as $140 to the ton. When it is taken into consideration that the rock can be mined and milled for $1.50 per ton, even if the ore should not contain a very large percentage of snlphurets it would be a paying proposition. From the developments thus far made everything goes to sbow that it is a true fissure vein and one that will increase in richness as deptb is attained. Mr. Harris, the superintendent, is a man noted for his energy and good business qualifications, and in addition to this he is a practical miner of 20 years' experience, and we believe the operations he is at present conducting will provs a successfol venture to all interested. There are at present 12 men employed in and around the miue.

El Dorado.

ORO FINO.—El Dorado *Republican*, July 27: It is reported that as work progresses at the Oro Fino mine the new managers are receiving more encouragement than resulted from the first run made in the mill after the mine changed hands and it was repaired. The amalgamating plates being new, it is said that mnch gold was not retained ou the first trial and that subseqnent results are better. Work on the chlorination plant is being pushed ahead.

Inyo.

GOON GOLN PROSPECTS.—Inyo *Independent*, July 28: Snpervisor Wilson was in town this morning. He reports tbe roads all right in his district. The river is running over the Lone Pine bridge, but as the structure is a very substantial one, there is no danger of its going out. Mr. Wilson says tbat quite a party will soon go into the Beveridge country, where some excellent prospects have recently been opened up. The Oorrasco boys and Jim Stansbury have just concluded a rnn of gold ore in the steam arrastre at the old McEvoy mill and made a good cleanup. Mr. Wilson will keep the arrastre running and will probably start the mill. The ruinous depreciation of silver has the effect of stimulating gold mining to a greater degree of activity. The miner must work or starve, and as silver is comparatively valueless the old gold-fields will be thoroughly prospected over.

BACK FROM INYO.—Walker Lake *Bulletin*, July 27: W. N. Cook, of the Central mine, returned Sunday from Inyo county. He says that the conntry in the vicinity of Bisbop is now a beantiful sigbt. Mr. Cook made several prospecting trips into the monntains of Inyo. He is of the opinion that it will some day prove to be a big mining region. But very little mining has ever been done tbere, and he says the general formation is favorable for qnartz ledges. Mr. Cook's jndgment on a mining proposition is second to none.

Nevada.

THE DAISY HILL TO START UP.—Grass Valley *Telegraph*, Jnly 28: All arrangements have been made for the resumption of work on the Daisy Hill quartz mine at this place. Tbe mine is situated between the Empire and the Centennial, and years ago paid well. Just what will be done immediately is not yet known. Mr. C. H. Taylor, a young man of ability and sound sense, and son of our townsman, M. C. Taylor, will be the superintendent. Mr. Taylor is a mecbanic in the first rauk, is a thorough bnsiness man, and will no doubt run the affairs of tbe company to their entire satisfaction. Tbe Daisy Hill bas a splendid record and the company now about to work it have all the capital requisite and necessary. The principal mover in the matter of the opening up of the Daisy Hill is Mr. Roberts, a successfnl mining man, now operating mines in El Dorado county.

MINING IMPROVEMENTS.—Snperintendent Geo. Mainhart informs us that he is making some important improvements at the Lone Jack mine. A new line of pumps are being put in clear to the bottom, and they consist of two six-inch pumps and one eight-inch pump. A pump bob is being put in place and a Peltou water-wbeel will be added.

PROPERTY BONDED.—Mr. Mulcahey has a large qnartz vein on his ranch near Newtown, and considerable of the rock has been taken from the ledge and assayed at different places. The result of the assay has always been flattering, so much so that A. Bnrrows has bonded the mineral deposit, also the entire ranch, as besides its productiveness in grain and fruit there is a vast amonnt of valuable timber on the premises. Mr. Burrows is in San Francisco, and it is understood that he is making arrangements for starting active operations upon the mine immediately.

NO CLEANUP.—Onr several contemporaries published an item to the effect that the Seven Thirty mine had recently made a cleanup of ore paying very good indeed. Such is not the case, as we are informed by Geo. Taylor, the superintendent. There has been no cleanup on tbe last run of ore and the mill has been idle for several days ou account of a scarcity of water for running the mill. Mr. Taylor thinks, however, when he does make the cleanup that the yield of gold will more than verify the figures quoted by our contemporaries.

A RICH STRIKE IN THE BALTIC.—Nevada City *Herald*, July 28: Snperintendent Joseph Snyder of the Baltic mine ou Saturday afternoou brought to town a small sack of ore containing two or three pounds, which was literally filled with gold, says the Grass Valley *Union*. Mr. Snyder picked up about a panfnl of the ore from the stope jnst opened up about 700 feet in from the mouth of the tunnel and 160 feet in depth from the surface, and was surprised when he fonnd that he had about $35 or $40 in the pan. The specimens were placed in the Citizens Bauk, where they are now on exhibition. There is a ledge in the stope varying in size from six inches to a foot and a half, and free gold is freqnently seen. All the ore looks well. There is considerable ground opened up, and Superintendent Snyder is keeping right along opening up more. The new five-stamp mill will be completed some time this week, and the crnshing of the 60 or 70 tons of ore on the dnmp will be commenced. There is every indication that tbe stockholders of the Baltic will soon cease paying assessments and receive dividends instead. There are about 12 miners at work at the Baltic at the present time.

A MINE BONDED.—Grass Valley *Telegraph*, July 29: The Holdeworth mine, near Bowman's Dam, is bonded in tbe sum of $100,000. Mr. Joseph Holdeworth has owned the mine for years and himself and son have been working on the claim from time to time. Several years ago the owners of the mine gave rock to parties who wanted to purchase mining property, and so pleased were they with the prospects thst they have bonded it in the sum above stated. Messrs. Roberts & Semm have bonded the property. Mr. Roberts is an expert miner and is engaged in mining all over California. It was not long ago when the gentleman went to China to superintend the erection of mining machinery and his venture was a most successful one. For years "Dock" Holdeworth has been carrying his qnartz to Bloomfield on his back, a distance of about 18 miles, and when he crushed or assayed the results were more than he expected.

RUNNING SMOOTHLY.—*Transcript*, July 29: The machinery at the Reward mine was started up Monday for regular work. Everything about the works runs smoothly and the sinking of the shaft is progressing as rapidly as can be expected. The ground they are at present running through is very dangerous, requiring the most careful timbering. When this bad ground is passed the work will be rushed ahead. The Reward machinery is driven by steam and the whistle can be plainly heard in town.

NEW GRAVEL MILL.—Nevada *Herald*, July 28: Oscar Brown is almost through with the new mill at the Kate Hayes mine, French Corral, and is now building a tramway for it. The mill is a heavy one with ten 1000-ponnd stamps and a six-inch cam shaft. It is calculated to grind np the cemented gravel which escapes the elevator in a thorough manner. Mr. Brown expects to have the mill ready for business by the 10th of August.

Placer.

MICHIGAN BLUFF.—Colfax *Sentinel*, Jnly 29: More men have been put on at the Turkey Hill of late. It has been reported here that there bas been a sale of the Morehead mine at Deadwood. There is a full crew at work again at the Old Mexican. A double shift (night and day) is pusbing things at present.

FORD MINE.—Work was suspended on tbe Ford mine for a few days. They expect to start up again soou with a large force of men. Things are running at full blast at the Pioneer and Dorer mines.

FOREST HILL DIVIDE.—Tbe Breece & Wheeler mine at Bath is working a good force of men. The miue still continues to look well. On Sunday afternoon we took a drive out to tbe Mayflower mine. Here we found one of the liveliest little mining camps in the whole county. Tbere are some 70 or 80 men employed at the mine, and everything is in tip-top sbape. The gold output still contiuues, and the mine has a bright fntnre. Tbe tunnel is in now abont two miles.

Plumas.

LABOR NUGGETS.—Plumas *National*, Jnly 22: Last evening, Lewis Bell showed us several large gold nuggets taken from his mine at Emigrant Hill last and this' week. One piece weighs $26, another $17, and numerous others weigh $10, $5, etc. He has a shaft down 50 feet, and in drifting off from it broke into tbis rich bed of gravel, which is apparently situated between two layers of bedrock, having an inclined position and being several feet apart. The gold is most peculiar in appearance, having a dark, rusty-looking coating. Mr. Bell thinks he has a bonanza. The channel is considered a part of that which supplied tbe gold fouud in Newtown Flat. Mr. Bell has already taken out a handsome lot of coarse gold, and will doubtless secure much more, thongb his limited means compel him to work to a great disadvantage.

IMPORTANT DEVELOPMENT.—On Saturday, M. E. Sanborn, ex-district attorney of Sutter Co., arrived in Qnincy, and on Monday proceeded to the Pilot Hill mine near Onion valley—a property in which he has beeu interested for several years, and on which very important developments have beeu made lately. The Pilot Hill quartz mine is sitnated near the head of the south fork of Poorman's creek, close to Pilot peak, about one mile from Onion valley. Recently, several small "stringers" close together were discovered and found to be very rich. Two shafts, each ten feet deep, were sunk and samples of ore taken from the bottom. From one assay made by Prof. Hanks, of about 20 pounds of the ore, he reported the yield per ton to be $655 in free gold and $360 in the sulphurets, thns making the total yield per ton to be $1015. By a fire test (small of course) the yield was $700 per ton. Another assay of samples sent by Mr. Sanborn to his brother in Denver yielded $1500 per ton. This small ledge is immensely rich, and the prospecting now going on indicates that a solid, permanent and extensive body of ore will be developed. This location covers 3000 feet. By means of small shafts, it has been traced on the surface 250 feet, and at all points good prospects are found. The company now has a tunnel in 40 feet on the line of the ledge. They propose to develop the property themselves, and they have great confidence in the fnture of it. With a tunnel not over 1000 feet long, the mine can be tapped at a depth of 800 feet. Near the Pilot Hill the company has another mine—the Plumas—3000 feet in length. An assay of the ore from this yielded $57 per ton. These properties are situated in a gold-producing country—that which fed Poorman's creek, one of the celebrated mining camps in the early days of placer mining in California.

RICH GULCH MINES.—Cor. *National-Bulletin*, Jnly 27: Your correspondent spent two days of the present week on the East Branch. I found the old resident miners of that well-known section busily engaged in their life-time occupation of mining. I was made aware that the diggings were no longer worked, but that the sources whence came their immense yield have now claimed the attention of the inquisitive few, whose reasoning faculties prompted them to seek the fountain-head from which flowed the golden stream that gave fame to Rich Gulch, Dingbat and Terry Hill, Terry Riffle, Ohio Point, 12-Mile Bar and other camps near by of lesser note. These mines, in the earlier days of mining, yielded vast amounts of gold, and the mother lode, in one immense, compact, defined body of quartz, as here found, is conceded by all who are acqnainted with, and by those who visit it, to be parent to all the richness of the lower lying surface. The lode follows the strike of the rock closely, running northwest and southeast. The altitude is over 4000 feet, the river, by its windings, crossing it twice, and cutting it to a depth of 2200 feet. On the Hallstead mine, consisting of four full claims, there have tbus far been found six chutes, all having a uniform dip to the west, or with the ledge. Their average width would perhaps be 60 feet, with a showing of free gold the entire width, the rock also being rich in sulphurets. The lower lying claims on the east, three in number, are owned by Mr. Duncan of Oroville. On these claims the immensity of the lode is fully shown, and full proof of permanency is here presented. At a depth of over 2000 feet (the height attained on the Hallstead mine), the ledge runs in width from 20 to fully 100 feet, a presentation of chutes being observed the same as seen on the higher ground already described. The prospects in free gold, obtained in my presence, were certainly very rich, and, thongh taken at raudom, showed uniform richness throughout. Tbe ledge is claimed for a distance of nearly three miles continuonsly. At the Fred Lewis mine on the upper end, the ledge is more or less stratified, with interlying areas of soft slate carrying free gold in liberal proportions, immense quantities of solid qnartz being freqnent. Mr. Lewis gives his whole attention to the smaller veins, from wbich, with a very crude one-stamp mill, which is run by haud, he extracts much gold, and is fully contented, not seeming to realize wbat a grand sbowing he has for a fortune if only he had a large plant ou bis property. This lode, from the East Branch to Deadwood creek on the west, represents what will undoubtedly become one of tbe greatest and richest quartz propositions in tbe State, when capital is once secnred and beavy plants are erected. The advantages for economical working were never superior in any other place—immense backs of over 2000 feet, to be obtained by running straight ou the lode from the river side; with forests of the finest sprnce and pine timber covering not only the surface of the location, but the snrrounding country as far as the eye can see; and, greater still, is a perpetual water supply, owned by Mr. Duncan. Rush creek fnrnishes the supply, which is conveyed in a ditch three miles long, with a capacity of 2000 inches. Tbe fall to be obtained at the lowest mill-site is 425 feet—a power sufficient to drive 1000 stamps. An inspection of tbis property will verify every word used in this hurried description. The Hallstead Bros. are now engaged in running a tunnel on the ledge, by which they are developing an immense chute of very rich rock, from the surface of which large quantities of good ore were taken. Tbe ledge on the surface is here 42 feet wide, and, at the present depth of their tunnel, 130 feet. The width is yet unknown. The rock at this depth shows free gold, evenly distributed, and is very rich.

San Bernardino.

VANDERBILT DISTRICT.—Pioche *Record*, Jnly 27: Deputy Recorder Harrison yesterday received a letter informing him that articles of incorporation of the Keystone mine at Good Springs had been forwarded to him for record. The amonnt of stock and names of officers are not known, as the papers have not yet arrived. The company have let a contract to haul 1000 tons of ore from the mine to the terminus of the Nevada Southern railway, near Vanderbilt. The Gold Bronze mine in Vanderbilt has been sold to Haggin & Tevis, the great California capitalists, for a large snm. Preparations are already being made to do an extensive amount of work on the mine. This is indeed good news for that section, as the incorporation of the Keystone and the interesting of such men as Haggin & Tevis in the mines means work for hundreds of men and conseqnent prosperity to the camps. A telegram from Needles states that $450,000 of bonds of the Nevada Southern railway branch line have been sold in New York City, and it is thought work will be pushed on to Good Springs and Pioche at once.

San Diego.

AT JULIAN.—*Sentinel*, July 27: S. L. Ferguson and W. Wilson had a clean-up Tuesday from a small crushing of ore taken from the Van Wert and Grand Central mines, which went $20 a ton. Considerable quantities of phenomenally rich rock have recently been struck in the Cbaparral mine, and are now being taken out. R. G. Melrose reports having taken out a lot of quartz from his mine on Boulder Creek. Seven shipments of bullion, some of them of considerable magnitude, were made from here dnring the past two weeks. We saw wood and say nothing, but at the same time we can't help thinking that we are adopting the right method of solving the financial question. Great are hammer and drill and miners' muscle.

BOULDER CREEK DISTRICT.—About a year ago a mining location was made by N. H. Campbell and others on Boulder Creek, about six miles west of Stonewall. Considerable work has been done from time to time since then, and very little said about it. Mr. Campbell has had a large amount of experience aronnd various mining districts, and is one of the best judges of ore and general mineral indications in the camp, and knows gold-bearing ore when he sees it. The formation and general characteristics are different in this location to what exist in the other mines in this district. The ledge is between porphyry walls, is about three feet wide, and shows the mineral ash on which mining experts rely for reliable croppings. The ledge can be traced for over a mile over the mountain. Very rich specimens of quartz have been taken out, and all the ore prospects good. There is abundant water power at hand, which may be required for working the mine, and all other necessary facilities are convenient.

Sierra.

WILL PROBABLY START.—*Mt. Messenger*, July 29: We learn that there is a good prospect of the Union Consolidated mine, at Happy Hollow, starting up again. They will run a new tunnel for a piece of ground they were unable to work through the old one, and which is known as "Number eleven."

Siskiyou.

UNDEVELOPED GROUND.—Yreka *Union*, July 29: It is very evident that new movements are being made in mining matters, and that new capital is being invested in that direction. We see this, in some cases, in our own county, Siskiyou, where open and partly developed rich mines have lately been bonded. This is particularly to be seen in the Humbug district, a short distance from Yreka. We take it that Siskiyou and other closely neighboring mining

counties yet offer a big field of undeveloped mining ground, where capital and labor may find rich profit from investment. Of this, there is not the least doubt.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—Virginia *Chronicle*, July 24: 1500 level—On the sill floor have reopsned the main south drift a distance of 40 feet; total length reopened, 80 feet—a distance of 256 feet from the main shaft. 1600 level—At the end of the east crosscut from the main south drift (77 feet out) at the point whsre it connects with the upraiss which was carried up to the north drift on the 1500 level, the south drift has been advanced 15 feet; total length, 58 feet; in porphyry and quartz of very low assay value. Have continued the work of hulkheading and closing the openings which connect with the old stopes in the north end of the mine where gas exists, and the escape of the gas is growing less. 1650 level—Have continned making necessary repairs to the drifts on the sill floor of this level. No ore has been extracted during the week, but the work of extracting will he resumed in a day or two.

OPHIR.—1565 level—The crosscut running east from the winze station on the sill floor of this level has been extended during the week 14 feet; total length, 168 feet; continuing in a harder porphyry formation showing clay separations. Have resumed (jointly with the Mexican Compauy) the work of making repairs to the main shaft.

MEXICAN.—On the 1565 level—The east crosscut from the nortb drift from the crosscut run east from the bottom of the winze, has been extended 20 feet; total length, 135 feet, in a porphyry, clay and quartz formation showing a little value. 1465 level—Have completed making repairs to the nortb lateral drift. Have resumed (jointly with the Ophir Company) the work of making repairs in the Ophir shaft.

UTAH.—340 level—The south drift from west crosscut No. 3, at a point 100 feet in from its mouth, has been extended 15 feet; total length, 29 feet; continuing in quartzite and porphyry formation of low assay value.

SIERRA NEVADA.—The intermediate tunnel on Cedar Hill has been advanced during the week 16 feet, making the total length 503 feet; the face is in clay porphyry. The joint Sierra Nevada and Uniou west drift, 900 level, bas been stopped aud a north drift started at a point 1520 feet west of the shaft.

UNION SHAFT.—The joint Sierra Nevada and Union west drift, 900 level, has been stopped and a north drift started at a point 1520 feet west of the shaft.

ANNES.—On 420 level—We have started east crosscut from north lateral drift to counect with south drift from east crosscut No. 1 nortb and advanced same 12 feet; face in quartz of low assay value.

GOULN & CURRY.—200 level—West crosscut No. 5, started in northwest drift, 432 feet from main west drift, has been advanced 5 feet; face in hard porphyry; total length, 550 feet. Sutro tunnel level—The joint uorth drift, which was started in east crosscut, 75 feet from main north drift, has been advanced 18 feet; total length, 64 feet; face of drift in vein matter.

BEST & BELCHER.—200 level—The north west drift has heen advanced 18 feet during the past week; total lengtb, 300 feet; face in soft porphyry. 900 level—West crosscut No. 5, started in southwest drift, 100 feet from west crosscut No. 4, has beeu advanced 14 feet; total length, 28 feet; face in hard porphyry. Sutro tunnel level—The joint north drift, which was started in east crosscut, 75 feet from main north drift, has been advanced 18 feet; total length, 64 feet; face of drift in vein matter.

HALE & NORCROSS.—On 900 level have advanced the south drift 21 feet; total lengtb, 131 fest; face in porpbyry. 1100 level—Have advanced tbe south drift 30 feet; total length, 128 feet; face in porphyry. Main shaft—Have completed retimbering the main shaft, and will now have to ease the timbers at different points between the 1000 and 1100 levels. During the past year the three compartments of the main shaft have been retimbered from tbe 1300 level up to within 320 feet of the surface, from which point considerable repairs were made but not thoroughly retimbered. In main incline we continue making necessary repairs between tbe 1300 and the Sutro tunnel level.

POTOSI.—The south drift, 35 feet west of the main shaft on the 850 level, is out 193 feet; face is in soft porphyry. The east drift, 73 feet above tbe 930 level, to connect with north raise from 930 level, is out 60 feet; face is in hard porphyry. Have started an upraise from the 8th floor of the south stope, 1000 level, to connect with south drift on 930 level, which is now up 14 feet; formation porphyry and bunches of quartz that give fair assays. Extracted and sent to the mill the past week 557 tons and 750 pounds of ore from the 550, 930, 1000 and 1150 levels. Milled during the week 555 tons. On hand at mill 160 tons and 1000 pounds. Average battery assays, $22.77; average car sample assays, $22.81. Shipped to the U. S. Mint, Carson, 437 pounds crude bullion.

CHOLLAR.—Are retimbering the main tunnel on 250 level and repairing the main incline between the 930 and 1200 levels. The west crosscut from the north drift from the east crosscut near the south line, 930 level, is out 58 feet; face is in soft porphyry and clay.

WARN SHAFT.—The station at the 820 level has heen completed and a drift started west which is now out 15 feet from the shaft.

EXCHEQUER.—The station at the 820 level of the Ward shaft has been completed and a drift started west which is now out 15 feet from the shaft.

ALPHA.—The station at the 820 level of the Ward shaft has beeu completed and a drift started west which is now out 15 feet from the shaft.

BULLION.—The station at the 820 level of the Ward sbaft has hsan completed and a drift started west which is now out 15 feet from the shaft.

OCCIDENTAL.—From the west ledge on 300 and 400 lsvels we are extracting and milling about five tons of ore per day of the average value of $26 per ton.

YELLOW JACKET.—We continus to work on tbe 1200 level, and havs crossed the vein on that level. Are now drifting south to a point to intersect the winze coming from the 1100, which is now down 60 feet. Tbe south drift from No. 2 crosscut on the 1100 level will connect to-morrow with the joint crosscut run by the Yellow Jacket and Kentuck, which will give a fine circulation of air on this level, and enable us in a few days to start an upraise in tbe ore. Rspairs have heen made to the incline of 1300 level, where we expect shortly to run some crosscnts to prospect the southern portion of the ground lying between the Yellow Jacket incline and the Kentuck line, which heretofore has never been explored.

Peavine District.

SPLENDID RETURNS.—Reno *Gazette*, July 29: Henry B. Rule and associates had an assay made of the rock brought in from his newly located claim on the side of Peavine mountain Friday night. The assay went $222 in gold, $53.20 in silver and 25 per cent copper to the ton. The *Gazette* believes that Mr. Rule has uncovered a bonanza that will attract the attentiou of the world before another year goes by. That Peavine is pregnant with precious metals no one doubts.

Bald Mountain District.

GOLD MINES.—Eureka *Sentinel*, July 29: Assessor J. G. Powell, accompanied by Dr. J. R. N. Owen, returned last Monday from a trip over to Bald Mountain, in White Pine county, where they visited some of the gold mines in that locality. Among others they mention the Lone Star mine, owned by Clay Simms and and Luther Clarke of this place, and say that the ore vein lies between porphyry aud granite walls and is four feet wide, and the ore will average at least $20 per ton. Dr. Owen of this place also has a very promising gold mine some four miles from the Lone Star mine. There are a large number of Placer mines about Bald Mountain, hut on account of the scarcity of water they can only he worked about one month during the rainy season. Water can be obtained the year round to supply a 20-stamp mill. Mr. Powell thinks Bald Mountain will come to the front in the near future.

Pioche District.

PROSPECTING.—Pioche *Record*, July 29: Quite a number of the men lately employed in the mines here have taken to prospecting, and it would not he surprising if some good discoveries are made.

ARIZONA.

HARQUA HALA SOLN.—S. F. *Chronicle*, Aug. 3: Negotiations for the sale of the famous Harqua Hala mines in Arizona to an English syndicate, which were interrupted by tbe death of George W. Bowers, have been carried to a successful termination and the last payment of the purchase price, which was $1,250,000, bas been made. Through Wells, Fargo & Co. Tuesday, $475,000 were paid on the order of Curtis H. Lindley, who represents the Eoglish syndicate. Of the total amount paid, the widow of George W. Bowers receives $500,000. A like amount goes to his surviving partner in the mine, A. C. Hubbard, and the promotors who engineered tbe sale divide the remainder. Mr. Hubbard, who has been staying at the Occidental for some time past, left immediately after the sale for Arizona. Mr. Lindley will meet him there and the transfer of the property will be made to the new owners. Just prior to Mr. Bowers' death negotiations had been almost consummated for the sale. An announcement by telegraph from Harqua Hala reported the actual sale. This apparently was a presumption from the knowledge that negotiations were in progress. At that time it had been stated that $70,000 had been paid on the mines. During the four or five months preceding his death Mr. Bowers is said to have received some $60,000 in dividends from the mine. The celebrated Harqua Hala mines are situated in Yuma county, A. T. They were located by Harry Walton, Robert Stein aud Mike Sullivan in 1888. Subsequently Stein's interest was transferred to A. C. Hubbard and Walton and Sullivan disposed of their interests to other persons. The Golden Eagle, one of the group, was jumped by a man named Horne. This resulted in a protracted and expensive litigation. Bowers bought out Horne and finally obtained a half interest in the mines. The Harqua Hala properties are located at two distinct camps, Harrisburg and Bonanza. Upon the properties coming into the possession of Bowers and Hubbard a large stamp mill was put up and all the facilities for crushing the ore arranged for. Great hoisting works were erected and the mines soon had one of the most complete plants in the West. The cost of milling the ore was reduced to $3 a ton. The wealth of the Harqua Hala mines is difficult to estimate. Immense ingots of gold have been received here for the past year and a half from these mines. On January 19th there arrived what was termed "the dome of gold." It weighed 309 pounds, and its value was placed at $81,200. It is claimed that there is an immense body of rich ore in sight, and that the prospects of the properties are better now than ever. When Mr. Bowers desired to buy an interest with Mr. Huhhard in the mines he did not have the ready money with which to make the purchase. He appealed to his brother, John T. Bowers of this city, and together they secured a loan of $45,000 from Wells, Fargo & Co. It is said that a large portion of the proceeds of the sale to the English syndicate will he invested in San Francisco realty.

MONTANA.

COPPER PROPERTIES ACTIVE.—Butte *Inter-Mountain*, July 29: Among the copper producers of the district tbs week has been a fairly active one. All the big copper concerns are employing the usual numbsr of men. At the Anaconda it is said 750 cars of ore are being hoisted daily, which would indicate that tbe force at this mine has been but slightly reduced. One of the most cheering signs of the times is the improvements and additions now being made at many of the copper-producing properties. F. A. Heinze, who has already expended a large sum of money in making additions to his smelter, has announced his determination to erect a 300-ton concentrator adjoining the smelter, and the work of excavating for it will he commenced about the middle of August. The new addition to the Heinze smelter is fast nearing completion and on next Monday tbe Western Iron Works of this city will begin placing the two converters in position. The building has been made large enough to accommodate four converters, hut for the present only two will be put in. Two reverbatory furnaces, a blast furnace and one O'Harra will also he added to the smelter. The foundation for a new air compressor has also heen laid and the compressor and engine, size 20x42, is now heing constructed by the Cbicago Iron Works and will arrive in a few weeks. The smelter is treating about 110 tons of ore per day and 200 tons of ricb copper matte is shipped each week to New York. Nearly all of this ore is being obtained from the Rarus and Glengarry. One thonsand tons of concentratiug ore was shipped during the past four days from the Rarus to tbe Liquidator concentrator, which is being operated by Mr. Heinze. The copper mines of the Bostou & Montana Company are all in operation. Sinking is still in progress at the West Colusa, the shaft now being developed to a depth of 560 feet. At the 600-foot level connections will he made with the 500-foot level of the Leonard. The West Colusa is considered the best of all the Boston & Montana properties. The ledge is said to he from 40 to 50 feet in width, and increasing in size and quality as depth is attained. At the Leonard shaft the mammoth Corliss pump is now in operation and working to perfection. This pump is considered vastly superior, hoth in economy and ease of operation, to the ungainly Cornisb pump. The Colusa properties handle an enormous quantity of water and it is expected that as new ground is opeued up and the work of development progresses the quantity of water will be much larger thau at present. A fine assay office and a new blacksmith shop are now in course of erection at the Leonard. With the exception of the Silver Bow mill, all the properties of the Butte & Bostou are in operation. The output of the mines and smelter bas been increased recently and the outlook for the future is very promising. A great number of men have left the city since the drop in silver. Some of them have gone on a visit to friends in the Eastern States or in the old country, while many more have gone on prospecting expeditions to various portions of the State or Idaho. The Highland mountains and other gold districts are overrun with prospectors just at this time. Many of the gulches in the vicinity of the Highlands are filled with gold, which, with water in ahundance, would pay several dollars per day per man. But water is very scarce where placer gold exists just now. North of Walkerville a number of men are engaged in placer mining and are said to he meeting with very good success.

NEW MEXICO.

GOLD MILLS AT WORK.—Silver City *Enterprise*, July 28: The recent rains bave furnished an abundance of water for all the mills at Pinos Altos, and they are all pounding away on rich ore from the gold mines of the camp. The company which has heen working the old Black Hawk mine, under the superintendence of Prof. E. M. Hand, paid off in full last Monday. Operations will be suspended until there is an advance in silver. The Manhattan tunnel near Pinos Altos is now in 765 feet, and it is expected any day now to strike the vein. When the vein is reached this will be another added to tbe uumber of producing gold mines of Grant county. O. Bailey has suspended work on the Liviugstone mine, in the Burro mountaius. The mine prodnces rich ore, but at present low prices of silver it will not pay to extract it and deplete the ore reserves at so little profit. Tbe Sheridan mill at Cooney, in the Mogollons, is being put in order to run the ore from the Little Fanny mine. The shaft on the Little Fanny is down 800 feet, and has a big body of rich ore from top to bottom. The ore in the bottom is as rich as any ever taken out of this famously rich mine. Wm. Walker has leased the Western Belle mine at Gold Hill. He has rented the Standard mill and will start crushing ore next week. Charles Knuckey, an experienced miner, is in charge of the mine, and there is no doubt that it will he a good paying proposition for all concerned.

Mining Share Market.

The stock market has had, perhaps, a little hetter tone this week than last, hut this is not saying very much. Several heavy assessments have been levied this week on prominent mines, as follows: Belcher, 25 cents; Ophir, 25 cents; Chollar, 10 cents; Yellow Jacket, 25 cents; Eclipse, 25 cents; Waterloo, 15 cents, and Segregated Belcher and Andes Cons. 10 cents. The delinquent lists of several other mines recently advertised string out to amazing proportions as published, which gives an unpromising future for the collection of money on these new assessments. The proposed draft of miners this week on the Comstock will leave only ahout 200 men on underground work, and it is threatened that even these will he taken off if the Miners' Union does not accept the 20-per-cent reduction of miners wages.

More of the Comstock mining companies met Monday, including the Ophir, Belcher and Chollar, and reduced the salaries of their officers from 25 to 50 per cent. Advantage was taken hy the companies named of the opportunity to levy some assessments, as they were in debt.

The Bodie *Miner* reports everything very quiet in Aurora, little or no work heing done and only a few of the old-timers left. The financial crash has affected the English syndicate that intended to take hold of mines in the district and nothing will he done at present.

The San Francisco Stock and Exchange Board is receiving many letters of inquiry from people interested in gold mines since it decided to list gold-mining stocks upon the payment of the annual dues of $100, waiving the usual charge of $500 for listing. Two mines have thus far heen listed.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JULY 4, 1893.

500,988.—ROTARY ENGINE—W. W. Andrews, Fallbrook, Cal.
500,839.—DISPLAY STAND—M. Anthony, Berkeley, Cal.
500,702.—CULTIVATOR—D E Barton, S F.
500,991.—SPLINT BASKET—G H Carlson, S. F.
500 993.—BUTTON-FASTENER—E. Christensen, Portland, Ogn.
500,853.—STREET-SPRINKLER—C. A. Clark, Portland, Ogn.
500,856.—PUMP—C. S. COX Spottiswood, Cal.
500,867—BEDSTEAD—J. J. Dugan, Salem, O n.
500,874.—LAND-LEVELER—Wm Falconer, Selma, Cal.
500,877.—AIR MOTOR—J P. Foulks, Verdi, Nev
500,836.—SMELTING FURNACE—J. L. Giroux, Jerome, A. T.
500,888.—GAME—A. M. Grubbs, Forest Grove, Ogn.
501.008.—TILE FRAME.—H. Hanstein, S. F.
500,766.—PAPER PRESS—W. F. Hess, S. F.
500,903.—CABLE RELEASER—A. Jeffreys, S. F.
500,910.—AIR BRAKE—W. Keywood, Tacoma, Wash.
500 935.—GAS GENERATOR—Jas. Nolan, Oakland, Cal.
500,946.—HORSESHOE—S. Pruden, Los Angeles, Cal.
500,819.—TRACTION WHEEL—A. G. Rose, Fresno, Cal.
500,779.—CHIMNEY—H. Savage, S. F.
500,624.—CAR COUPLING—J. L. Sorvell, Altbouse, Ogn.
500,970.—FORGING HAMMER—A. Sperl, Los Angeles, Cal.
500,677.—INJECTOR—J. W. Stanley, Oakland, Cal.
501,032—FRUIT-PICKER—J. Swanburg, Los Angeles, Cal.

The following brief list by telegraph, for August 1st, will appear more complete on receipt of mail advices:

California—John F. Appleby, Santa Cruz, grain-binder; John L. Blockbarger, Pasadena, orange or fruit cleaning machine; Joseph Clark, San Francisco, exploder for projectiles; William C. Dierrick, San Francisco, ratchet wrench; Benjamin F. Gilman, San Francisco, plant or tree protector; Elias Groat, San Luis Obispo, two patents for apparatus or machines for reducing and softening bituminous rock; John C. Hunter, San Francisco, tool-holder; Henry G. Krasky, San Francisco, station indicator; Ross A. Ludlow, Globe, churn; William H. Masterman, Oakland, fictional motion transmitter; George H. Merrick, San Francisco, bushing and faucet; Thomas Sheen, Oakland, lawn sprinkler.

Gregon—Joseph E. Adcox, Lehmon, jewel and pivot gauge; Eugene R. Holcomb, Portland, electric water-wheel regulator; Daniel K. How, Portland, book-binding; Leonard Kuckartz, Portland, warehouse gang-plank.

Washington—Guy Sterling, North Yakima, corduit.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

DETACHABLE UMBRELLA COVER.—Matilda C. S. Brown, Berkeley. No. 501,819. Dated July 18, 1893. The object of this invention is to provide an easily detachable covering for parasols and umbrellas, so that with a single frame a person may have as many different covers as may be desired, it being especially applicable for parasols, of which ladies desire to have many different covers to go with different suits of clothes. As many covers having as many different colors or styles as may be desired are made to fit a single frame, each cover having its top stitched to it, and the spring catches, and it is only necessary to unfasten the spring catches, slip the tops off the ends of the ribs and release the clamping sleeves to remove a covering. Another cover can be substituted by reversing the operation.

STEAM ENGINE.—Augustus Knudson, San Francisco. No. 501,793. Dated July 18, 1893. This is a novel invention for engines propelled by steam or other vapor, or air, or gas under pressure. It consists of an arrangement of transversely reciprocating pistons, one moving within another, and the exterior one within a correspondingly shaped case, valves by which the propelling medium is admitted alternately at opposite ends of the pistons, and a crank and crank shaft through which the reciprocal motion is converted into a rotary motion.

EVAPORATING PAN.—Elton R. Shaw, Los Gatos. No. 501,848. Dated July 18, 1893. This invention relates to that class of evaporators in which the liquid to be evaporated is exposed in thin sheets or films to the action of the evaporative agents. There are many liquids, notably saccharine liquids, in which deleterious chemical changes take place at or near their boiling point. It is the object of this invention to avoid such changes and to provide simple means for rapidly evaporating liquids at a low degree of heat, and with mechanism that is easily controlled and readily cleansed from scale or other dirt. The essential parts of the invention are one or more rotating cylinders, which may be made of metal, paper, glass, or other substance, incased in a tight jacket, which may be filled with water, steam, hot air, or other vapor, or liquid, and an exhaust fan for creating a current of air through the cylinder or cylinders.

Market Reports.

The Markets.

SAN FRANCISCO, Aug. 3, 1893.

Government Silver Purchases.

For the first time in three years the Government failed to buy the full monthly quota of silver last month. Most of the purchases made were the result of counter bids, after the prices of sellers had been declined. There were no proposals considered on the 3d or 5th July. On the 7th July 1,298,000 ounces were offered. Of this quantity the Mint Director took in 200,000 ounces at 72c, and offered the same figure for the balance. The next day he secured 538,000 ounces at the price offered. The purchases for July were as follows:

Date.	Range.	Ounces.
July 7	72.00	638,000
July 10	71.50	100,000
July 12	71.50	30,000
July 14	72.50	100,000
July 17	73.40	380,000
July 19	71.50	75,000
July 21	70.00	345,000
July 24	69 60	157,500
July 26	70.30	196,000
July 28	70.30	50,000
July 31	70.30	216,000
Public awards		2,287,500
Private purchases		96,500
Total		2,384,000

Fine Silver in July.

The price of fine silver last month was hardly the same for any two consecutive days. On the 1st of July it was quoted at 33½d for 925 fine in London and 70c for 1000 fine in New York. From the 4th to the 7th of July it was 34¾d to 34¾d in London and 71 to 75c in New York. After that date it fell to 33¼ in London and 70½c in New York. The best price in the last half of the month was 33¾d in London and 72¾c in New York. These were the quotations on the 17th of July. On the 22d of July it was down to 32½d in London and 69c in New York, the lowest figures for the month. For the last three days in July it was 32½d in London and 69⅞ to 69¾c in New York. The extremes in both markets for the first seven months of the year were as follows:

	London		New York	
	High.	Low.	High.	Low.
January	38 9-16d	38 2-16d	84c	82½c
February	38 8-16	38 2-16	84¼	83¾
March	38 6-16	37 9-16	83⅝	81⅜
April	38 5-16	37 14-16	83¾	82½
May	38 9-16	37 8-16	84⅛	82¾
June	38 12-16	30	83¾	62
July	34 12-16	32 2-16	75	69

In July, 1892, the extremes in London were 40¾d to 39 1-16d, and for the first seven months of that year 43 12-16d to 39d.

Pig Iron.

Complete statistics of the United States production of pig iron for the first half of 1893 are available. They show the total production to be 4,562,918 tons, against 4,769,683 tons in the first half of 1892, the decrease being 206,765 tons. According to the bulletin of the Iron and Steel Association the production for the second half of 1893 will be much below that of the corresponding half of 1892. It is, however, considered remarkable that the first half of this year of depression should show an increase of production over the second half of the previous year of 1892, the increase being 175,601.

NEW YORK, July 20.—Following are the closing prices for the week:

	Silver in London	N. Y.	Copper.	Lead.	Tin.
Thursday	32½	69⅜	10 00	3 35	19 05
Friday	32½	69¾	10 00	3 35	19 00
Saturday	32½	69¾	10 00	3 40	19 00
Monday	32½	69¾	9 95	3 40	18 90
Tuesday	32¾	70¼	9 90	3 30	18 85
Wednesday	32¾	70⅜	9 90	3 30	18 85

Voltaic Mineral Rods.

Important to Miners and Treasure-Seekers. Send Stamp for Circular to E. A. CGFFIN, No. 47 Bristol Street, Boston, Mass.

MINING SHAREHOLDERS' DIRECTORY.

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ASSESSMENTS.

COMPANY AND LOCATION.	NO.	AMT.	LEVIED.	DELINQUENT.	SALE.	SECRETARY.
Alhambra M Co, Nev	17	25c	July 14,	Aug 18,	Sept 11.	F S Schwarze, 324 Washington
Alpha M Co, Nev	60	25c	July 31,	Sept 4,	Sept 25.	E B Holmes, 309 Montgomery
Alta M Co, Nev	43	15c	April 25,	Aug 4,	Aug 25.	L Osborn, 309 Montgomery
American and Mexican M Co	10	2c	June 28,	July 31,	Aug 19.	F M Husted, 522 Montgomery
Belcher M Co, Nev	45	25c	July 31,	Sept 4,	Sept 25.	C L Perkins, Mills Bldg
Bodie Cons M Co, Cal	16	15c	July 24,	Aug 28,	Sept 25.	M E Willis, 309 Montgomery
Bulwer M Co, Cal	8	10c	July 20,	Aug 31,	Sept 22.	L Osborn, 309 Montgomery
Carmelo Land and Coal Co, Cal	6	$4	July 21,	Sept 1,	Sept 20.	R McDobis, Mills Bldg
Challar M Co, Nev	35	10c	July 31,	Sept 5,	Sept 26.	C E Elliott, 309 Montgomery
Crown Point M Co, Nevada	61	25c	June 12,	July 18,	August 8.	J Newlands, Mills B'ld'g
Eclipse M Co	5	2c	July 27,	Sept 4,	Sept 25.	C Tum Sudan, 216 Bush
Exchequer M Co, Nevada	36	Rc	June 29,	Aug 31,	Sept 21.	C E Elliot, 309 Montgomery
Gold Mountain M Co, Cal	5	$14	July 13,	Aug 16,	Sept 4.	J F D Curtis, 325 Montgomery
Gray Eagle M Co, California	33		July 10,	Aug 16,	Sept 14.	C C Harvey, 309 Montgomery
Hale & Norcross S M Co, Nevada	104	50c	June 21,	July 27,	Aug 18.	A B Thompson, 309 Montgomery
Kentuck Cons M Co, Nev	5	10c	July 11,	Aug 15,	Sept 5.	A Waterman, 309 Montgomery
Lady Washington M Co, Nev	9	10c	April 18,	Aug 9,	Aug 30.	L Osborn, 309 Montgomery
Mexican M Co, Nev	48	25c	July 17,	Aug 22,	Sept 12.	C E Elliott, 309 Montgomery
Occidental Con M Co, Nevada	13	10c	June 22,	Aug 16,	Sept 8.	A K Durbrow, 309 Montgomery
Ophir M Co, Nev	60	25c	July 31,	Sept 4,	Sept 25.	E B Holmes, 309 Montgomery
Pearl M Co, Arizona	15	5c	June 3,	July 12,	August 2.	A Waterman, 309 Montgomery
Peerless M Co, Arizona	20	5c	June 15,	July 20,	Aug 10.	A Waterman, 309 Montgomery
Potosi M Co, Nevada	38	25c	July 11,	Aug 15,	Sept 5.	C E Elliott, 309 Montgomery
Red Jacket Cons M Co, Nevada	1	5c	May 24,	July 15,	August 5.	S M Capp, 415 Montgomery
Savage M Co, Nevada	81	25c	June 20,	July 25,	Aug 14.	E B Holmes, 309 Montgomery
Seg Belcher and Mides Con M Co, Nev	12	10c	July 26,	Aug 29,	Sept 18.	E B Holmes, 309 Montgomery
Utah Cons M Co, Nevada	18	10c	June 16,	July 18,	Aug 5.	A W Havens, 309 Montgomery
Ventura Asphalt Co, Cal	1	5Cc	July 11,	Aug 26,	Sept 18.	F. A. Brooks, Montg'y Block
Waterloo G M Co, Cal	1	15c	Aug 2,	Sept 6,	Sept 25.	J M Bailey, 18 Post
Weldon M Co, Arizona	7	5c	June 15,	July 15,	Aug 9.	A Waterman, 309 Montgomery
Yellow Jacket M Co, Nev	55	25c	July 29,	Sept 5,	Oct 9.	W H Blanvelt, Mills Bldg

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Cons New York M Co, Nev	Annual	C E Elliott, 309 Montgomery	Aug 5
Derbec Blue Gravel Co, Cal	Annual	T Wetzel, 320 Sansome	Aug 16
Irma M Co, Cal	Annual	H H Bodwell, Crocker Bldg	Aug 10
Martin White M Co, Nev	Annual	K L Ross, 120 Sutter	Aug 17
Navajo M Co, Nev	Annual	J W Pew, 310 Pine	Aug 8
Waterloo G M Co, Cal	Special	J M Bailey, 18 Post	Aug 10

DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE
Bulwer Cons M Co, California	5	L Osborn, 309 Montgomery	Oct 20
Champion M Co, California	10	T Wetzell, 310 Pine	May 15
Cons New York M Co, Nevada	10	C E Elliott, 309 Montgomery	Feb 15
Great Western Quicksilver M Co	25	A Halsey, 328 Montgomery	Oct 8
Mayflower Gravel M Co, California	10	D M Kent, 330 Pine	June 30
Pacific Coast Borax Co, California	1 00	A H Clough, 230 Montgomery	Jan 10
Standard Cons M Co., California	10	J W Pew, 310 Pine	July 25

San Francisco Metal and Coal Market.

ANTIMONY.			STEEL.		
Per lb	— @	14	English, lb	— @	18
BORAX.			Canton tool	— @	8¼
Refined, in car lots	— @	7½	Sl'k Diam'd tool	8½@	15
Powdered, do	— @	7½	Pick & Hammer	6½@	10
Concentr'd, do	— @	6½	Machinery	4 @	5
All grades jobbing at advance.			Toe Calk	— @	4½
COPPER.			TINPLATE.		
Bolt	22 @	—	B. V. steel grade		
Sheathing	22 @	—	14x20, spot	— @	5 87½
Ingot, jobbing	— @	14½	Charcoal, 14x20	— @	5 87½
Do, wholesale	— @	13½	Do roofing, 14x20	— @	5 87½
Fire Box Sheets	22 @	24	Do, do, 20x28	— @	11 75
IRON.			PIG TIN.		
Bar, base	— @	3	Spot lb	— @	24
Norway, base	— @	4½			

PIG IRON.	Spot.	COAL.	
Eglinton ton	20 00@— —	SPOT FROM YARD—PER TON.	
Glengarnock	21 00@— —	Wellington	$8 00
Am. Soft, No. 1	22 00@— —	Greta	7 50
Shotts No 1	22 00@— —	Nanaimo	6 50
Puget Sound	20 00@— —	Gilman	6 00
Clay Lane White	21 00@— —	Seattle	6 50
Langloan	22 50@— —	Coos Bay	5 50
Gartsherrie	22 50@— —	Cannel	8 50
Sarrow	22 50@— —	Egg, hard	12 00
Carnoffeet	22 00@— —	Wallsend	7 25
CHROME IRON ORE.		Scotch Splint	8 00
Per ton	10 00 @— —	Brymbo	7 50
LEAD.		West Hartley	8 00
Pig	— @	4½	TO LOAD—PER TON.
Bar	— @	5½	Australian	6 37@— —
Sheet	— @	7½	Liverpool Steam	8 50@— —
Pipe	— @	6¾	Scotch Splint	00@— —
SHOT.			Cardiff	5@— —
Drop, sizes *smaller* than B, ⅜ bag of 25 lbs	$1 80		Lehigh Lump	11 00@— —
Do do, B and *larger* sizes ⅜ bag of 25 lbs	2 00		Cumberland	12 00@— —
Buck, Balls and Chilled do, ⅜ bag of 25 lbs	2 00		Egg, hard	10 00@— —
QUICKSILVER.			West Hartley	7 50@— —
Home trade, pr. flask	42 50 @43 00		COKE.	
			English, to load	89 50@10 00
			Do, spot, in bulk	—@10 00
			Do, in sacks	—@11 50
			Cumberland	9 50@— —

EB. WILLIAMS,

ATTORNEY - AT - LAW,

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Reference—L. C. Hughes, Governor; Roy & Titcomb, Nogales; International Bank, Nogales.

THE RUSSELL PROCESS.

See Exhibit at World's Columbian Exposition, Chicago, Mining Building, Southwest Gallery, Location, Column 25B.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, August 3, 1893.

9:30 A. M. SESSION.

350 Best & Belcher	50c	100 Potosi	30c
100 Crown Point	3½c	50 Savage	30c
550 Ophir	50c		

2:30 P. M. SESSION.

120 Con. Cal. & Va	1.00	390	30c
100	95c	100 Savage	30c
100 Challar	20c	100 Sierra Nevada	25c
100 Ophir	50c	200 Yellow Jacket	45c
100 Potosi	35c		

Pacific Stock Exchange.

9 AND 10:15 A. M. SESSIONS.

50 Andes	11c	100 Mexican	27c
300 Belcher	20c	300 Potosi	32c
550 Best & Belcher	48c	100 S B & M	3c
50 Challenge	9c	50 Ophir	51c
300 Con. Cal. & Va	1.00	300	9c
100 Conference	30c	150	47c
500 Crown Point	30c	50	46c
500	29c	950 Yellow Jacket	40c
100 Hale & Norcross	50c	100	41c

2 P. M. SESSION.

300 C C & V	1.00	50 B & B	47c
150 B & B	48c		

NOTICE!

Bids are Asked until September 15, 1893

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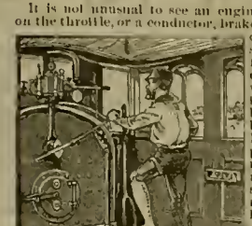

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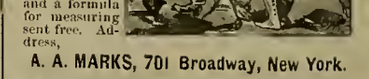

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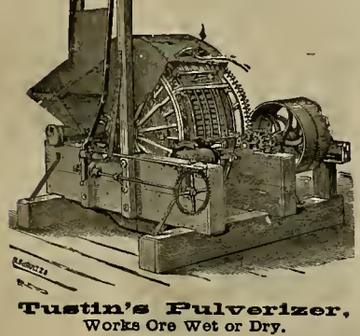

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STEAM ENGINES—Plain Slide Valve, Corliss High Pressure, Corliss Compound Condensing and Non-Condensing.
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SOLE AGENTS FOR.....
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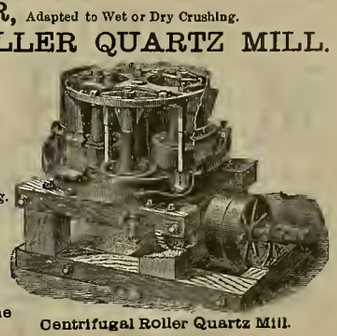

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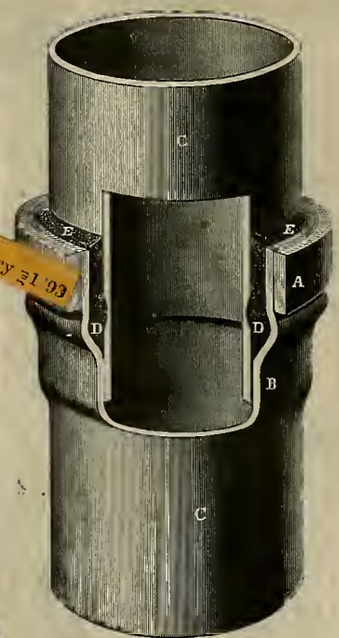

A—Wrought Iron Ring Shrunk on Pipe.
B—Bell End Pipe.
CC—Body Pipe.
D—Lead Space, showing Patent Lock Joint.
E—Lead Space.

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The Advantages of it are:

SIMPLICITY IN CONSTRUCTION,
PERMITTING HANDLING WITHOUT THE AID OF SKILLED LABOR.

A RELIABLE JOINT,
WHETHER USED ON LIGHT OR HEAVY TUBING.

A SAVING IN COST
OF TRANSPORTATION AS COMPARED WITH ANY OTHER STYLE OF WROUGHT OR CAST IRON PIPE.

ONE OF MANY LETTERS.

PULLMAN, WASH., May 4, 1892.

AGENTS AMERICAN TUBE AND IRON CO., PORTLAND, OR.:
GENTLEMEN: In reply to your inquiry as to how we are satisfied with the Matheson Joint Pipe, which we have used here, I have pleasure in informing you that we are so well pleased with it that it is required by the town authorities to be used for all public water mains. No other is permitted in any system which the town owns, or expects to acquire.
It is not necessary to say anything further as to what we think of it here, after giving it a thorough test.
Very respectfully, W. V. WINDERS, Mayor.

SEND FOR CIRCULARS AND PRICES TO THE AGENTS,

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Mechanics and Popular Science.

VOL. LXVII.—Number 7.
OEWEY PUALISHING CO.

SAN FRANCISCO, SATURDAY, AUGUST 12, 1893.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

Miners' Wages on the Comstock.

The Comstock miners are not disposed to accept a reduction of wages unless some hetter reasons are assigned than those presented hy the managers of the companies. The reduction of salaries of officials, they contend, should have taken place long since, and if this had heen done and economy practiced in other ways, the men who do the actual work in the mines need not have heen called npon to accept less wages. The members of the miners' unions claim also that their wages are not paid hy the mine managers, hut by the public who hold shares in the various companies they represent, and if the mines had heen operated properly in the interest of the stockholders the cost would be 60 per cent helow present monthly expenses without redncing miners' wages. These men cite the case of A. C. Hamilton, who they say has heen drawing a salary of $2500 a month as the superintendent of Chollar, Potosi, Alpha, Exchequer, New York, Silver Hill and Ward shaft, and has an assistant in Roger Pendergast at $1500 a month. Then the presidents and other officials in the city offices have heen drawing hig salaries, which have to he paid out of the assessments collected.

As a result of these and other unwarranted expenses, many mines which have heen prodncing ore for years have heen maintained hy the assessment plan, and not hy dividends. The Crown Point, Belcher, Yellow Jacket, Savage and Hale & Norcross, though regular ore producers for 20 years, have had to have their alleged deficiencies in operating expenses made up hy assessments.

The officers of the Virginia Miners' Union, Gold Hill Miners' Union and Mechanics' Union have communicated with Messrs. J. L. Flood, John Mackay, J. P. Jones, F. G. Newlands and other prominent men holding controlling interests in Comstock mines, asking if they favor the proposed reduction in miners' wages. Mr. Flood, while he helieves the wage-earners should be the last to he reduced, thinks the reduction would be beneficial at present and commendahle on the part of the miners.

Supt. Yerington says the Virginia & Truckee Railroad is prepared to make ample reductions on ore, wood and lumher freights to the point of almost no profit, with the understanding, of course, that all other interests connected with the mines do the same, the ohject being to place the Comstock mines on a living, paying hasis if possihle, giving people all the employment and husiness to which they are justly and fairly entitled.

If the railroad company, water company, mill companies and salaried officials all accept material reductions and more economical methods prevail, it would seem as if the mines could be operated without reducing the wages of the actual miners, especially as there are now only ahout 300 of them at work on the lode. On the other hand it may he said that miners are plentiful just now and thousands are in search of work, so that those in positions could hetter accept lower wages than be thrown out of work altogether. The delinquent lists on assessment sales of the Comstock companies are growing wonderfully in length, showing a very decided disinclioation to pay on the part of stockholders, so that all the companies are short of funds. All the miners in the union oppose the reduction of their wages, claiming that what is paid them cuts a very slight figure in the monthly expenses of operating the Comstock mines. In this most people familiar with the situation will be apt to agree with them.

SELBY SMELTING AND LEAD COMPANY'S SMELTING WORKS.

ALFRED DE LA BOUGLISE, managing director of the Lexington mine of Butte, Mont., is in this city. Mr. de la Bouglise represents the French syndicate which not only owns the Lexington, hut also several California and Colorado properties. The Golden River (or Red Point) mine on the Forest Hill Divide and the Hogshack, near hy, belong to this syndicate, which has also huilt a custom mill at Cripple Creek, Colo. The Hogshack is not at present heing operated but work continues in the Golden River. Mr. de la Bouglise has had considerahle experience with California gravel properties.

A GREAT MANY miners from Colorado, Nevada and elsewhere are coming to Grass Valley, in this State, in search of work. The town already has plenty of miners for all the work on hand, and there are now about five men for every position. It is useless for more miners to go there in search of employment.

THE White Cloud copper mine and smelter, near Lovelocks, Nev., has heen closed down, owing to the stringency of the money market.

The Selby Smelting and Lead Company.

The accompanying cut is a view of the Selby Smelting and Lead Co.'s works, located at Vallejo Junction, Cal. These works were established in 1868, and are the pioneer smelting and refining works of the Pacific coast. The larger part of the gold and silver produced on the Pacific coast, from Alaska to Mexico, is parted and refined at these works. In addition they smelt gold, silver and lead ores and concentrates, and are in constant receipt of such products from all points on the coast. During the present depression in silver and lead mining, when so many smelting works all over the West have closed down, the Selby Company have continued their husiness just as usual, greatly to the henefit of the mining community. This company also refine hase lead bullion produced by the various reduction works tributary to San Francisco; and also manufacture sulphate of copper (bluestone) in large quantities. A special article of manufacture is the Standard machine-loaded shot gun cartridge, loaded hy the Chamherlin machine, which is the most perfect loader ever invented These cartridges give the greatest satisfaction and are used almost exclusively hy the crack shooters on this coast and elsewhere.

This company also have an extensive factory located on the southeast corner of First and Howard streets, where they manufacture drop, buck and chilled shot, lead pipe, sheet lead, bar lead, lead traps, solder in various shapes, hahhitt metal, sash weights, etc. They also deal extensively in hlock tin, spelter, antimony, copper, etc.

Their main office is located at 416 Montgomery street, San Francisco, where deposits of gold and silver are received for refining. They also keep on hand refined gold and silver for use of jewelers and silver-platers. In addition they assay ores and hullion, reduce jewelers' sweeps and photograph waste. The premises used for their main office are those formerly occupied hy the San Francisco Assaying and Refining Works, and later hy the Pacific Refinery and Bullion Exchange, whom they succeeded in 1879. This huilding has heen in continuous use as a gold and silver refinery and assay office since early in the fifties. They have recently purchased a lot in the rear 35x55 feet, and now have a property 192½ feet deep, running through from Montgomery to Leidesdorff streets. They are now making extensive improvements in this property to meet the demands of their husiness, and will shortly have the finest smelting rooms and assay offices to he found on this coast or elsewhere. The officers of the company are, A. J. Ralston, president; H. B. Underhill, Jr., secretary; Alfred Ropp, superintendent.

MINING AND SCIENTIFIC PRESS.

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W. B. EWER. }
CHAS. G. YALE, } ..... EDITORS

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Comment.

Some of the anti-debris papers think that the professions of the miners at their State convention were not sincere, and that their pledges have not been kept. They quote the address of the Miners' Association, in which all miners are asked to desist from illegal mining, and individuals are asked to accept the policy of the association in this respect. It will be remembered that the Miners' Association made this appeal long ago, and urged that all hydraulic mining cease wherever it was calculated to injure the navigable streams or valley lands, or wherever the debris could be carried into navigable streams. The writer of this paragraph was the writer of that resolution, and remembers that it was adopted by the miners' executive committee without a dissenting vote. The anti-debris people now profess to believe that the miners were insincere in this. We are sure that they were not, and are not. Some individuals doubtless did not comply with this request, just as some individuals had continued to mine all these years when most of the hydraulic mines were closed. Who they were and why they were permitted to do this could doubtless be better explained by those directly or indirectly connected with anti-debris movements, than by those connected with the miners' movement. If these men who broke the laws had been rigidly held to account and punished, it would have been greatly to the general advantage of the whole hydraulic-mining interest. They have injured its cause and given out not only weapons, but sinews of war, to the enemy of their industry. The Miners' Association discountenances this whole system, issued its address in all sincerity, and stands by it to-day as it did the day it was first published.

Mr. J. A. Edman, superintendent of the Diadem mine, Meadow Valley, Plumas county, has been for many years making a study of the subject of milling of gold ores. In addition to the ordinary practical observations gained by a miner and millman of experience, he has been making microscopical examinations of mill products and has developed many interesting facts. The editor of the MINING AND SCIENTIFIC PRESS had an opportunity last week to examine many of the slides prepared by Mr. Edman, and found them of the greatest interest to gold miners and millmen. The slides prove beyond question that much fine gold is lost in ordinary operations, and they show the wonderful divisibility of the metal in many ways. The investigations in connection with the selenides show the reason why some gold miners have failed to obtain the gold from their ores. Doubtless many are operating on this class of ores without knowing the reason why the gold will not amalgamate. Mr. Edman's researches in connection with concentrates, sulphurets and plate sands are especially interesting and valuable. Very great care and skill have been exercised in the preparation of these slides for use under the microscope; but Mr. Edman is an enthusiast in this direction and has spared himself no trouble. He has prepared a series of articles on the subject of milling of gold ores, the first one of which appears in the PRESS of this week. The articles should be read by all interested in gold-mining, as many new points are brought out which are valuable in every-day work around a mill.

The manager of the Anti-Debris Association, in a recent report to the Executive Committee, referring to what he calls the efforts of the Miners' Association to secure such amendments to the Caminetti hill as will virtually withdraw the sting from that law, says that, in his opinion, "it is an effort to be permitted to mine without restriction and to have the Government build the restraining works for the miners." If Mr. Phipps is earning his salary only by this kind of talk, he is overpaid. If the miners want to mine without restriction, what do they want of restraining works? If they want the Government to build dams for them, then they cannot be making an effort to mine without restriction. The fact is, this manager is opposed to anything the miners want on general principles, and he is making all round guesses as to what they do want. If the dams will hold back the debris, as the Government engineers assert, experience proves and the Government law warrants, why should Mr. Phipps or his association object to them, even if the Government builds them for the miners and collects pay from them afterward. His association pretends that it only wants the rivers and bordering lands protected. Yet the Anti-Debris Association opposes the dams, which are the very things to preserve the rivers and lands. Their course is entirely inconsistent. What difference can it make to them who builds the dams, provided they are built and the debris restrained? They ought to be glad to see the works built by anybody so it costs them nothing. The truth is, however, if these dams are built the Anti-Debris Association, its managers, spies and employes will all be out of a job. This is the only way to account for their being opposed to the miners' efforts to comply with the law and have the dams built. This is one of the reasons for keeping up the agitation against hydraulic mining outside of the plain one of preserving the rivers and lands.

The MINING AND SCIENTIFIC PRESS made a correct prediction when it stated that there would be no great rush to list California gold mines with the stock boards, to be made the subject of stock speculation like the silver mines. The San Francisco Stock Exchange suspended its rule for 30 days and admitted gold mines without the $500 fee, asking only the $100 annual dues. Two weeks have passed since the announcement but only two or three companies have availed themselves of the opportunity. Most of the California gold mines are worked as legitimate mining enterprises and the stock-dealing feature has never been at all prominent. It is true that those which have been listed are working mines of value and reputation, but it is evident that the gold-miners are not anxious to see their mines manipulated as silver mines have been. There are several thousand gold properties in this State, big and little, and when only two or three of them take advantage of the offer of free entry, it shows that the gold miners are rather shy of the stock-dealing feature.

If Hon. J. A. Yerington, chairman of the Nevada State Board of World's Fair Commissioners, is correct in his assertions, Nevada is a great deal worse off than California in the matter of idle mining property. He tells a Chicago *Dispatch* reporter that there is to-day in Nevada $150,000,000 worth of mining property which is lying practically idle because of the depression of silver. We have in California $100,000,000 worth of practically idle hydraulic mines, so Nevada is $50,000,000 ahead of us in this respect. Our mines are gold producers when they can be worked, and while the Nevada mines are mainly silver, considerable gold is also produced from them. As to the time of starting up all these these idle properties, there is almost as much doubt in one case as in the other. The responsibility rests largely with Congress in both instances.

A representative of the Southern Pacific Co. has been up in Shasta county inquiring into the mining interests in regard to the shipment of ores. He is also to visit Trinity and Siskiyou counties. The present rates from Redding to the Selby Smelting Works on tide-water are $84 per ten-ton carload for ore not exceeding an assay value of $75. It is about time that such an exorbitant charge should cease. It is time also that the railroad company should cease charging on something that is none of their business—the value of the ore. Increasing the rate per ton as the value of the ore increases, thus taking the profit which the mine-owner should have, is a Southern Pacific custom, but it ought to be stopped. If the company will put any sort of decent rate on ores, the shipments from the northern counties would largely increase, and numbers of mines, now idle, could be operated. Perhaps the company fears that the upper river will be made navigable to Redding, and intends forestalling any probable opposition by lowering its rates.

Quartz mining is looking up in California. Several good sales have been made of late, and some of the larger properties are increasing their output. There is a good demand for "going" gold mines, and some demand also for those in process of development. It will not be long before prospects will be sought for also. There are more gold mines and prospects in California than in any other State in the Union, and now that so many silver and lead mines have closed down in other sections, attention is being turned to the gold claims of this State. Those who own small claims should open them up, as far as possible, and put them in shape to be examined by possible purchasers. This is California's chance, while mining is depressed elsewhere, to enlist the aid of capital in developing her gold properties.

Application for License to Mine by Hydraulic Method.

The first formal application for license to mine by the hydraulic method, under the Caminetti law, is now before the California Debris Commission, and the advertisement for the hearing will be found in another column of the MINING AND SCIENTIFIC PRESS. This application will be speedily followed by others which are now being prepared.

A large proportion, however, of those who would be willing to erect restraining and impounding works are financially unable to do so. If permission had been given ten years ago to put up these dams, with the Government's guarantee that the owners could work behind such works, almost all the mines could have complied with the requirements. The situation now, however, is different. The reservoirs, ditches and flumes are in bad order, or useless, the pipe-lines rusted out, and the owners "broke." Not having been able to work their mines, they have neglected or partly abandoned the plants, and have not now the means to rebuild them.

This is a very unfortunate state of affairs just at the present time, since it is absolutely impossible for the mine-owners to obtain money to equip their claims. Money, too, is necessary to build the dams. It is useless to file petitions for license to mine when it is known that a chief requisite is to construct a restraining dam, and there are no available funds to do this. Money is not now being loaned on city real estate, or on the usual stocks, bonds or other securities. Borrowing it on a mine in the mountains, to be worked under a new law not yet put to the test of judicial inquiry, is entirely out of the question.

And yet the country wants the gold buried in these hills more than it ever did before. It is not only California, but the whole United States needs it. We know the gold is there, and we know that by turning on the water it will reveal itself and become available for the uses of man. The bank is there but its doors are locked.

To save some narrow strips of agricultural land along the banks of a river—land already partly destroyed—this gold must remain hidden, until a less prejudiced later generation sees fit to take it out. The unrestricted operation of these mines for a single year would pay for the same lands three times over. It is to be hoped that these coming generations will not be so hard up as the present one, but even if they are not, they will be wise enough to get this gold.

They will realize that pumpkins, potatoes, peanuts and other agricultural products may be raised in Texas, Kansas, Nebraska and elsewhere, but that these places cannot produce gold, while California can. It is gold we are all after in any business, even in agricultural pursuits. Gold is the result looked to in the end. And here is gold direct at one operation, yet it may not be taken because some agricultural land is injured.

A great many persons, with little knowledge of this subject, have been led to believe that an immense extent of agricultural land all over the State has been, or would be, injured by the debris from the hydraulic mines. This is entirely a mistake. The damage is confined to lands bordering the river in a few counties only. This has been injured beyond doubt. Its total value, however, was originally not above $3,000,000, while the stoppage of the mines practically confiscated, or rendered useless, mining property worth $100,000,000, and producing $8,000,000 to $10,000,000 a year.

It is true that the damage to the Sacramento river should be also considered. Debris from all sorts of mines has been going into that stream ever since mining commenced in this State, and debris from agricultural sources has been going into it, too. Constant plowing loosens the soil, and the rains carry much of it into the streams.

Cutting of timber on the mountain sides and the de-

struction of the brush leaves them in such condition that debris is added from this source too. The bands of sheep loosen the soil also. The progress of civilization in all regions adds to the burdens of the rivers in many ways. Napa creek, Petaluma creek, Alviso creek and dozens of others in purely agricultural sections have filled up and shoaled since the country was settled.

Under the new law the owner must pay the penalty not only for the results of his work but that of the farmer, horticulturist, lumberman, sheepman and others. The burden is all on the miner. He must not only put up a dam to hold back his debris but must pay three per cent of the gross yield of his mine for the privilege. More than that, the Government wants to protect its navigable streams, but the miner must pay the expense.

Now these miners are perfectly willing to put up the dams at their own mines, and hold back the debris caused by their operations. But they do not want to pay for the result of the work of those who have gone before them, or the result of the work of those in other occupations.

The Government should, at its own expense, and to save its own rivers, build the dams at the heads of the main navigable streams so as to restrain the material now on them and sure to come down in time. It would thus hold back all that has been contributed by all classes. The State stands ready with $250,000 to add to whatever the Government contributes for this purpose. When these main dams are built, then the miners, when they build their dams, will take care of that for which they are alone responsible.

The men who manage the Anti-Debris Association have officially declared themselves as opposed to dams for holding back debris, notwithstanding the contrary opinions of engineers. These anti-debris people, while opposing the dams, offer no suggestion for any other remedy except the one they have always maintained—the absolute closing of all hydraulic mines, so as to save all the cabbage patches. At this time, however, they will find little sympathy with their ideas, since during the past two years the people of this State have become educated on this subject, and want the mines to resume work as soon as possible.

The fact remains, however, that very few miners have availed themselves of the opportunity to apply for a license, because very few are in a position to build the dams, for the reason stated. They must get help in some way if the mines are to be again operated. If Congress would put up the dams and collect the pay from the miners afterward, the question would be solved at once; but whether this can be done or not remains to be seen.

Now that one mine has applied for license to operate, we shall soon find out the ideas of the Commission as to the nature of the restraining works. Many miners have been waiting for this. It is not probable, however, that the Commission will require the same kind of works for every mine. Each case will be considered separately, and the surroundings and conditions studied. Some claims can be easily prepared, and others cannot be prepared at all. The judgment in all these matters rests with the Commission.

At a meeting of the Harbor Commission two weeks ago six bids were received for the construction of slips 5 and 6 at the foot of Market street, and the lowest was $48,945. The bids were all rejected and new ones were opened this week. As a result the contract was let to G. W. Stewart for $43,939 dollars. Seven bids were handed in, the other six as follows: San Francisco Bridge Company, $47,500; Doe, Hunt & Co., $52,870; Darby Laydon & Co., $48,700; California Construction Co., $44,444; B. McMahon & Son, $48,950, and Healy, Tibbetts & Co., $50,300. Mr. Stewart is the general manager of the Pacific Pine Lumber Company, and acted in this matter for his corporation. Hitherto the lumber company has confined itself to furnishing its product to contractors. It entered into competition on this work because no satisfactory arrangement could be made with any of the contracting firms to furnish them lumber. The estimate of Chief Engineer Holmes of the Harbor Commission for the net cost of the two slips was $43,200; that is to say, the bare cost of the material and labor, allowing nothing for profit. The lumber company's bid is $789 above net cost.

Coast Coal-Miners' Wages.—The Nanaimo (B. C.) colliery employes have accepted, by a majority vote of 284, the reduced terms offered by the owners. It was a question of doing this or seeing the mines close down. The East Wellington coal-miners offered to accept a reduction of 10 per cent, but, on tendering it to the manager, they were informed that unless they accepted the 20 per cent cut the mines would remain closed. In the case of the Northfield men, they offered to accept a reduction of five per cent, which the superintendent refused to accept. Finally, the men agreed to accept ten per cent reduction, which was agreed to. At the Dunsmuir-Wellington mines the men expect to be called upon to stand the same reduction as the other miners in the district. At the Union collieries, Victoria, work is brisk and the miners are working full time.

The gravel mines on Old Baldy mountain, San Bernardino county, are to be worked by a Nebraska company. A reservoir has been built and a pipe line laid for hydraulicking at an expense of $30,000.

Foundry Notes.

The foundry and machine business in San Francisco was never duller than it is at present. The financial stringency has affected every shop in town, large and small, and all are suffering from want of orders. Very radical steps are about to be taken in the matter of reduction of expenses by the larger shops, which will doubtless be followed in time by all engaged in the line of iron-working. The Risdon Iron Works lead off in reducing wages, and the other establishments have the same thing under consideration. This is something that was bound to come in time, as, under the present conditions, there is little or no money in the business for those having their capital invested. Higher prices for coal and iron and higher wages than in the East have restricted the operations of the local works, and, if they are to continue operations with any success, a change must be made in the wages of the mechanics.

As to possible strikes against the reduction, this is a very poor time for that sort of thing. There are a dozen men ready to take the place of one who quits work. Work is scarce for men, as orders are scarce for the shops.

There has been a gradual change in the past few years in the foundry business in this city, as the circle has narrowed within which orders are probable. Chicago manufacturers have cut into our trade to a great degree, and our foundrymen have been compelled to carry in stock certain articles which were formerly built only to order. Small engines, pumps and numbers of other articles of ordinary types are now sold by some of the foundrymen just as they are by importers who are not manufacturers. While under present circumstances no large enterprises are being inaugurated requiring new machinery, very little indeed is being done at the local shops, all of which are running short-handed.

The burning of the factory of the Pacific Nail Works at Oakland last Sunday morning entailed a very heavy loss, reaching almost $200,000, with $82,000 insurance. The warehouse and rolling mills were saved, but the main buildings with the machinery were totally destroyed. The works have not been in operation for some time, there being a large stock of nails on hand. The capacity of the works is 25,000 kegs a month. They have $140,000 worth of raw material on hand, and the works will shortly be rebuilt.

Advices from Los Angeles are to the effect that work has been commenced on the erection of a rolling mill in that city, and the plant is expected to be in operation by January. It is stated also that the machinery has been ordered from the East; that sheet iron only will be made at first; and that the mill will make a market for scrap iron, which has now practically no value. This latter item will be news to the Pacific Rolling Mills, Judson Iron Works, Pacific Nail Works, etc., which are large consumers of scrap iron. There may be room for another big rolling mill in California, but it does not look like it. Just at this time the Pacific Rolling Mills have some 500 or 600 men less than usual at work.

Coast Industrial Notes.

The Chino beet-sugar factory is now daily making shipments of sugar to this city.

The number of trainmen now on the extra list of the Southern Pacific is said to be 260, the largest in the history of the company.

Over 500 men were thrown out of employment at Usal, Mendocino county, recently, in consequence of the closing down of the lumber mills in that vicinity.

The prevailing hard times exercise an influence on the street-car lines, and all the companies in this city have found it necessary to reduce the number of cars in use.

A reduction of forces was made at the Scotia mill, near Humboldt bay, on August 1st, laying off 80 men. One-half of the mill has been shut down also, which will make the reduction affect about 130 men.

California makes more sugar from beets than any other State in the Union. Last year there were 15,993 acres planted to beets, and 43,500,000 pounds of sugar were made, an increase of about 35 per cent.

The large iron bridge spanning the Russian river, at Hopland, collapsed on Tuesday, and dropped a four-horse team and wagon into the river. The bridge is not an old one, but has been considered unsafe for some time.

In Alameda county there are 214 vineyards, with an acreage of 7083. The stock of wine on hand is 2,034,550 gallons. There is said to be an excellent opportunity for a large public winery that would pay investors well.

Considerable land reclamation work is going on in Butte and Sutter counties. A tract of land 32,800 acres in area, in Butte and Sutter counties, which is overflowed every winter by the Butte creek and Sacramento river, is being reclaimed.

At Ensenada, Lower California, two flour mills are now running. The country around produces considerable wheat, and the flour is being furnished to various places along the peninsula on both sides. There are now close to 12,000 people in Ensenada.

On Monday bids were opened at Ukiah for furnishing the male ward of the insane asylum. Charles Cunningham and Eversole & Templeton, local bidders, got the bulk of the contracts. The Golden Gate Manufacturing Company and the San Jose Woolen Mills Company also secured contracts.

The new order for the reduction of working days of railroad men affects all employes of the shops located at Ogden, Terrace, Wadsworth, Truckee, Sacramento, Dunsmuir, Portland, Oakland, San Francisco, Bakersfield, Los Angeles and Tucson—about 6000 men in all—and comprises blacksmiths, boiler-makers, engineers (stationary), firemen (stationary), machinists, painters, carpenters and others with their various helpers. Auditor Foster stated that the monthly pay of all these shopmen would aggregate about $500,000.

The Redlands Electric Company turned on the current last Saturday, lighting the streets of the city. The event was celebrated by a grand mass meeting. The new factory of the Union Ice Company, run by electricity, will be started at once. The electric works are located in the mountains, six miles east, with 1300 horse-power developed.

Construction work on the new Mission-street electric road in this city has been stopped for some time. The reason for the delay in carrying on the work is said to be due to the financial stringency which has struck the Southern Pacific Company, which corporation owns the City Railroad. Work on the newly-ordered cars, it is said, has also been stopped.

Builders and contractors of Oakland will be interested to learn that a company representing large capital will soon establish in Oakland a depot for the sale of brick, cement, lime, plaster and lumber. Water-front privileges are said to have been secured for current delivery, and it is intimated that a branch depot will also be established in East Oakland.

The dam of the big storage reservoir near Eddy, N. M., was carried out by a cloudburst last Saturday. The dam was located six miles up the valley from the town, but the water did not enter the town. The reservoir had 7,500,000,000 gallons. The damage amounts to $125,000. President Hagerman telegraphs Manager C. B. Eddy from New York that the dam will be rebuilt at once.

The Judson Powder Company are manufacturers of dynamite and other explosives, at West Berkeley. A number of citizens have brought suit to restrain the company from putting up more buildings or manufacturing explosives on the present site. The powder company has expended a great deal of money in improvements at West Berkeley, and naturally objects to moving away.

The electric cars will be running to Baden inside of three weeks. That is what is promised by the San Francisco and San Mateo Electric Railway Company. Fifty men are at work between the present terminus at Holy Cross cemetery and Baden, and over half of the roadbed has been laid since work was commenced two weeks ago. The other half will be laid within the next 14 days, and the mile and a half of extension will be completed and in operation by the first of next month.

The Southern Pacific Co. will meet the opposition on the creek route to Oakland by a cut to a 5-cent fare. In addition to the single fare, packages of 100 tickets will be sold for $2.50. These tickets will be good for any trip on the creek route and will be transferable. The 5-cent fare applies to the steamer Alameda, which runs between slip 8, on this side, and the foot of Broadway, Oakland. The steamer will make six trips daily, leaving San Francisco on the quarter after the odd hours, and Broadway, Oakland, on the quarter after the even hours.

Through business has fallen off greatly on the Southern Pacific, and the local business is reported as indifferent. Under these circumstances as little work as possible in keeping up the line in a condition for traffic will be done. It is quite likely that other measures of economy will be practiced, that train crews will be further reduced and that the office may suffer. The truth is that for the first time in its history the Southern Pacific is sorely pressed for funds. It has not the money with which to pay its employes. The June salaries have not been paid as yet.

A dispatch from Astoria (Or.) dated Aug. 5th says: The total pack of salmon for the whole river to date is 239,612 cases, and of this 145,620 cases have been put up in the Astoria canneries. The pack to date, at a careful estimate, includes 380,000 cases of Chinook salmon and 920,000 of small fish, mostly steelheads and blueblacks. It is now certain that the total season's pack will amount to from 275,000 to 282,000 cases, or at best 173,000 cases short of last year. All the canneries on the lower Columbia river will this year pack fall fish. They will start to work again September 10th and run continuously till the 1st of November. This will be the first year since 1887 that fall fish have been packed on the Columbia.

The railroad company has reduced the number of working days in the week at its Sacramento shops from six to four. This has been done instead of reducing the force. The new order applies to all employes in the motive power and machinery departments not directly connected with the routine road services, and will not affect the forces in the car-repair yards except as circumstances will permit. Hereafter the shops will not be operated on Friday and Saturday of each week. The total number on the payroll August 1st was 1978 men, out of which only 350 will continue to work the usual time. This order is considered as simply the postponing of repair work and improvements for 60 or 90 days, by which time it is hoped the stringency will be over.

John H. Wise, Henry Epstein, James D. Byrnes, Chas. Goodall and Geo. A. Andenreid have asked for a franchise for a new street railroad in this city. The main line, double track, will extend from the ferries on East street to Broadway, along Broadway to Webster street. From the last-mentioned intersection there will be two branching roads. One of these will turn south along Webster to Fulton street and on Fulton to Lott, then one block south on Lott to Grove street and on Grove street to Stanyan, that is to say between the Hayes and McAllister-street cable roads to the park. The other branch will be run from Webster and Broadway north straight to the bay shore. This line would pass on the west of Lobos square and to the bay between the Black Point and Presidio reservations. The main line would be continued from Broadway and Webster streets out the former to Scott, then down Scott to Washington, and so straight out west to First avenue, and south along that avenue to Fulton street,

on tbe north side of Golden Gate Park. Still anotber branch would be run down to tap the main artery of tbe city. This line would start at Broadway and Dupont street and continue south along Grant avenue to Market street. Tbe object of the road is to tap Russian hill and Presidio heights, two sections of tbe city whicb are now being much favored for residence purposes.

THE prevailing financial stringency has reached tbe Asiatic quarter, and signs of business failure and the consequent poverty are seen at every band in San Francisco's Chinatown. Many firms bave quit business altogether. The United States census of 1890 showed the Chinese population of San Francisco county to be 25,870. During the past three years there bas been an almost constant exodus of Chinese from the city, and conservative estimates place the decrease at nearly one-third. King Owyang, the Chinese vice-consul, estimates that San Francisco's present Asiatic population, including over 500 Japanese, is from 10,000 to 12,000. The police and customs officials, who also keep a pretty close watch on Chinatown, agree that the vice-consul's figures are not far out of the way.

Studies in Gold-Milling.

[Written for the MINING AND SCIENTIFIC PRESS by J. A. EDMAN.]

In viewing the field of metallurgy it cannot be denied that, in comparison with the advances apparent in the treatment of the ores of other metals, but little progress has been made toward ratlonal methods in gold-milling since this industry was first inaugurated in the early days of California quartz mining; and the advance made has been chiefly confined to tne improvement of mechanical means for crushing and concentrating ores, and in the adoption of the chlorination process, with its modifications and improvements, during the last decade. The cyanide process can as yet scarcely be said to have been tested enough to determine its applicability to most gold ores.

The treatment of ores carrying fine gold may be said practically to embrace all gold ores, as but few of these, even when containing comparatively coarse gold, fail to carry a large percentage of fine gold, on the recovery of which the economical success of gold-mining chiefly depends. The total absence of any general system in the treatment of gold ores is strikingly exemplified in the able papers by Mr. T. A. Rickard on the "Variations in the Milling of Gold Ores" now appearing in the *Engineering and Mining Journal* of New York, and applicable not only to Australia, but also in less degree to the gold-producing regions of the United States. In his paper of June 17th this writer touches the keynote to the solution of the problem, when he says: "The great axiom of successful milling is to adapt the reduction process to the character of the ore treated," instead of continuing in the vain attempts, now so general, of trying to adapt the ore to some locally prevailing practice.

In solving this problem there should be no strict line drawn between the labors of millman and metallurgist, as both arts must be merged into one; and the aid of science would have been invaluable had it been directed into this channel, which unfortunately does not appear to have been the case, except in a few instances in the history of the chlorination process.

Without attempting to enter into a review of the different methods of gold-milling now practiced in California, it may be of interest to miners and millmen to give some of the writer's experiences during many years of active work, and which in some degree offer a solution of the problem so long discussed.

Leaving out of view other issues of less importance, the main hindrance to the economically successful treatment of gold ores appears to lie in the generally prevailing ignorance of the true physical and chemical character of such ores, even among otherwise well-informed men of the craft, and the deeply-rooted misapprehensions and prejudices resulting therefrom. It is true that assays and analyses properly applied will partially solve the problem, but while the importance of these cannot be denied, they have as yet signally failed to throw full light upon the subject.

Convinced of the enormous losses in general mill practice, and after repeated lneffectual attempts to solve a difficult question in the treatment of low-grade ores, the writer entered upon a thorough microscopical examination of gold ores and mill products as the only available solution of the difficulty, and with very promising results. A general outline of his observations will be given in the following pages, after which their relation and influence on present gold-milling methods will be briefly discussed.

The investigation was carried on in connection with test mill-runs of ores of different classes, mainly from one large lode presenting a great variety of ores, both free-milling and highly pyritous, carrying both coarse and very fine gold, and was also supplemented by typical samples of the ores and mill products of other mines differing in mineralogical and geological conditions from the first mentioned. The material subjected to examination was as follows:

Ores of every available variety; pulp as issuing from batteries; sands from plate tables; blanket washings, plain and concentrated; concentrations from different classes of ores; slimes from pan and arrastre grinding; sands from tail sluices; average tailings and slimes; amalgams from batteries, aprons, plates, and from pan grinding; floured mercury from batteries, plates, riffles and tailings; contents of floured mercury; roasted concentrates; tailings from chlorination process; accessory minerals not considered gold-bearing, and products of infiltration, percolation and deposition withln gold-bearing lodes.

The loss of gold in mill practice can be traced to the following causes, stated in the order of their importance to the industry:

1st. The extreme diffusion of gold in lts ores.

2d. Our imperfect knowledge of the laws governing amalgamation of gold.

3d. The frequency of chemical combinations between gold and other elements.

In giving the size of gold particles the limit of unaided normal human vision may be taken at the 1-250 of an inch, and smaller sizes will be considered microscopic. Dimensions will be given in fractions of an inch.

While a great diversity as to the average size of gold particles appears in the ores of different lodes, the fact remains that a great proportion of the metallic gold occurs microscopic and invisible even to magnifiers in nrdinary use, whicn readily explains the fact that ores giving even a high assay sometimes show llttle or no gold in panning. A great proportion of the gold observed was below the 1-1000 inch in diameter, and the limit of diffusion has not been reached with hlgh powers representlng a visibility of 1-50,000 inch. This statement holds good not only for gold in quartz of all kinds, but also for that contained in pyrites, both bright and oxidized. The form of the gold particles appears nearly the same both in quartz, sulphides and oxides, being, contrary to general popular opinion, in irregular but compact, occasionally crystalline grains, while acicular shapes or films appear as exceptions. The films are generally found on and near the surfaces of pyrites and in microscopic fissures in hard, fine-grained pyritous quartz. The most irregular, attenuated and crystalline forms appear among the fine particles of purely metallic gold found in decomposed ores, and specially in the snft gouges of the walls of gold lodes and preferably in the talcose rocks, and appear to great extent to be products of infiltrations, solutions and depositions from constantly proceeding chemical changes. The quality of the quartz seems not to affect the size of the gold, and some of the hard, dense and flinty quartz has been observed in which the faint yellowish bands of color are resolved under high powers into a cloud of infinitesimal gold particles seldom exceeding 1-20,000 inch in diameter. Frequently rounded grains with smooth surfaces, in their magnified forms resembling placer gold, are found enclosed in oxidized pyrites, and many varieties of these and other sulphides exhibit an internal silicious skeleton or arborescent structure among which most of the gold is seen deposited.

It is difficult to convey to the mind an understanding of the infinite subdivision of gold in ores except by demonstration under the microscope, but, as an illustration, the revelations of a typical sample will be given. A single chip of hard and flinty, slightly yellowish quartz, 1-50 inch in diameter and mounted in balsam, presented the following features under a power of 50 diameters; gold particles varying in size from 1-1000 to 1-12,000 inch, and generally in compact grains, were noted, exceeding 300 in number. The specimen, being nearly transparent, showed these not only on the surface, but diffused through the mass of the quartz. Higher powers developed still greater numbers of much smaller gold particles even below 1-30,000 inch in size.

Gold in similar forms and sizes has also been observed by the writer in the oxides nf iron and of manganese, in talc, in hornblende, in calcite, in dolomite, in stibnite and senarmontite, in the molybdenate of lead and in the tellurides and selenides of gold and silver.

The sizes and forms of gold in quartz are strikingly exhiblted in many more products, chief among which may be noted the plate sands or gold-bearing grains of quartz slightly adhering to the amalgamated plates of gold mills. The gold originally in pyrltes can be best observed in the minerals resulting from their oxidization and still retaining the form of the original pyrite, or in the products of their decomposition by chemical means.

The Resolutions Adopted at the Silver Convention.

The report of the Committee on Resolutions of the Chicago Silver Convention was adopted as follows:

Bimetallism is as ancient as human history. For more than 3000 years gold and silver came down through the ages hand in hand. Both metals were named together and indissolubly united in the Constitution of the United States as the money standard of value of this country; that in 1873, wlthout the previous demand of any political party or any part of the people, and without public discussion, silver was stricken from the place it had occupied since the days of Abraham and Pharaoh, under the circumstances of such secrecy that A. G. Thurman, W. M. Stewart, B. W. Voorhees, J. G. Blaine (then Speaker of the house), J. A. Garfield and other members of Congress voting for the bill subsequently publicly declared they did not know until long afterward that so great a change had been made in the financial system; that the debates in Congress show that the measure was partly ascribed to one Ernest Seyd, a London banker, who, it is claimed, was sent to Washlngton by the moneyed classes of the old world to secure its passage by secret and corrupt means; that President Grant, who signed the bill, declared long subsequently that he did not know it demonetized silver; that the object of this attack on silver was to double the purchasing power of gold, thus reducing the price of all commodities, arresting enterprises, impoverishing the toiler and degrading mankind; that the awful consequences of this act are now upon the whole world.

The movement of the great crops now being gathered demands a vast amount of currency, which the banks are unable to furnish. In the midst of these conditions the daily press is clamoring for the repeal of the Sherman act, although the repeal means the stoppage of the issue of more than $3,000,000 of money every month, ignoring the fact that to hold the balance level between the debtor and the creditor factions, the supply of currency must increase with the increased population and business. The proper growth of the population is 33 per cent every ten years. The increase of business is much greater.

The preamble then quotes at length from the utterances of James G. Blaine, Daniel Webster and Secretary Carlisle, in favor of a bimetallic currency, and John Sherman on the dangers of monetary contraction. The resolutlons then declare:

There must be no compromise of this question. All legislation demonetizing silver, and restricting the coinage thereof, must be immediately and completely repealed by an act restoring the coinage of the country to the conditions established by the founders of the nation, which continued over 80 years wlthout complaint of any part of our people.

Every hour's delay in undoing the corrupt work of Ernest Seyd and our foreign enemies is an insult to the dignity of the American people, a crushing burden on their prosperity and an attempt to place us again under the yoke from which George Washington and his compatriots rescued us.

We protest against the financial policy of the United States being made dependent upon the opinion or the policies of any foreign government, and assert the power of this nation to stand on its own feet and legislate for itself upon all subjects.

We declare that the only remedy for purely metallic financial troubles is to open the mints of the nation to gold and silver on equal terms at the old ratio of sixteen of silver to one of gold. Whenever silver bullion can be exchanged at the mints for legal tender silver dollars worth 100 cents, that moment 412½ grains standard silver will be worth 100 cents, and, as commerce equalizes the prices of all commodities throughout the world, whenever 412½ grains standard silver is worth 100 cents in the United States, they will be worth that everywhere else and cannot be bought for less.

Legislation to demonetize silver has given an unjust increase to the value of gold at the cost of the prosperity of mankind, wheat and all other agricultural products which have ridden side by side with silver. While the Sherman act of July 14, 1890, was the device of the enemy to prevent the restoration of free coinage, and is greatly objectionable because it continues the practlcal exclusion of silver from the mints, and reduces it from a money metal to a commercial commodity, nevertheless its repeal without the restoration of free coinage would stop that expansion of our currency which is required by our growth in population and business and widen still further the distance between the two preclous metals, thus making the return to bimetallism more difficult, greatly increase the purchasing power of gold, still further break down the price of the products of the farmers, laborers, mechanics and tradesmen, and plunge still further all commerce, business and industry into such depths of wretchedness as to endanger the peace and endurance of free institutions and the very maintenance of civilization.

We therefore, in the name of the republic and of humanity, protest against the repeal of said act of July 14, 1890, except by an act restoring free bimetallic coinage as it existed prior to 1873. We suggest that the maintenance of bimetallism by the United States at a ratio of 16 to 1 will increase our commerce with all the silver-using countries of the world, containing two-thirds of the population of the world, without decreasing nur commerce with the natlons which buy our raw material, and will sooner compel the adoption of bimetallism by the nations of Europe than any other means.

We assert that the unparalleled calamities which now afflict the American people are not due to the so-called Sherman act of 1890, and in proof thereof call attention to the fact that the same evil conditions now prevail through all the gold-standard world.

We are convinced that, bad as is the state of affairs in this country, it would have been still worse but for the Sherman act, by which the nation has obtained, to some extent, an expanding circulation to meet the demands of the continent in process of colonization and the business exigencies of the most energetic and industrious race that ever dwelt on the earth, and we insist upon the execution of the law without evasion so long as it is upon the statute books, and upon the purchase of the full amount of silver each month for which it provides, the end that the monthly addition to the circulating medium the law secures shall be maintained, and we would call the attention of the people to the fact that in the midst of all the troubles of the time the value of the national bond and the national legal-tender money, whether made of gold, silver or paper, had not fallen a particle.

The distrust is not of the Government or its money, but of the banks, which have, we believe, precipitated the present panic on the country in an ill-advised effort to control the action of Congress on the silver question and the issue of bonds.

We invite the bankers to attend to their legitimate business and permit the rest of the people to have their full share in the control of the Government. In this way they will much sooner restore that confidence which is so necessary to the prosperity of the people.

It must not be forgotten that while the boards of trade, the chambers of commerce, the bankers and money dealers are worthy and valuable men in their places, the republic can more safely repose upon the great mass of its peaceful toilers and producers, and that this, "a business man's age," is rapidly exterminating the business men of this country. The time has come when the politics of the Nation should revert, as far as possible, to the simple and pure condition out of which the republic arose.

We suggest for the consideration of our fellow citizens, that the refusal of the opponents of bimetallism to propose any substitute to the present law, or offer any plan for the future, indicates either an ignorance of our financial needs or unwillingness to take the public into their confidence. We denounce the attempt of the unconditional repeal of the Sherman law as an attempt to secure gold monometallism, in flagrant violation of the last national platforms of all the political parties.

The committee also recommended that the convention immediately appoint a committee composed of a member from each State and Territory, to act in conjunction with the American National Bimetallic League, to devise a plan and provide ways and means for impressing upon Congress and the people the impendlog perils from the final demonetization of silver.

Tests of Mine Safety Lamps.

At the last meeting of the Central Mining Institute of western Pennsylvania, William West, a mine foreman, engaged at one of the Frick plants in the Connellsville region, read a paper on safety lamps, of which the following is a digest:

After the Mammoth explosion the H. C. Frick Coke Company abolished the open lights in all its mines in the Connellsville region below water level, causing at that time a demand for safety lamps in excess of the supply. The result was the putting of a great many poorly-made lamps on the market. At the Frick these inferior lamps have been replaced with better-made lamps, and at the present time our pillar and stump drawing is being done with lamps having a metallic cover over the gauze. The common Davy lamp is still used by the fire bosses for examination purposes only.

For the last couple of years I have been anxious to have the Davy and Clanny lamp tested in a strong current of explosive mixtures and see for myself whether or not the burning gas could be blown mechanically by the current through the apertures of the gauze before its temperature was sufficiently reduced to prevent the ignition of the gas on the outside of gauze. I was also anxious to see if a red-hot wire gause would fire gas on the outside of the lamp and cause an explosion. During the last summer we had conditions favorable for getting some practical information on the subject.

A captive feeder in the bottom at the entrance of a chute between a couple of parallel butt headings furnished the gas. The first test was made with a common Davy lamp in daily use; the velocity was 5½ feet per second; the flame on the lamp wick was half an inch in length; the gas burned in the lamp until the gause became red hot and fired the gas on the outside of the lamp. A Clanny lamp without a shield was then tried in the same current; four times out of six the flame on the lamp wick went out, but the gas kept on burning in gauze above the glass cylinder and would have made the gauze red hot and caused an explosion on the outside of the lamp if it had not been removed. In the other instances the flame in the lamp became extinguished when the gas exploded in the lamp. The Davy lamp was then fitted with a new gauze, carefully examined with a magnifying glass, placed in position and the velocity increased to nearly 11½ feet per second. The gas on the outside of the lamp fired almost as soon as the gas and current were turned on, making a clear case of the flame being driven through the gauze and firing the gas and causing an explosion. The Clanny lamp without a cover over the gauze was then tried in the same current, and twice in succession when the gas fired in the lamp it went out; on the third trial, before the lamp was placed in position, a handful of fine coal dust was sprinkled over the gauze, and with the turning on of the current about half a peck of coal dust was liberated at the windward end of the box in a direct line with the lamp; here the result was a violent explosion of the gas and dust on the outside of the lamp, the color of the flame was changed to a dark red, the chute was filled with sparks, and when the lamp was picked up the glass was found to be badly cracked. I had no means of ascertaining the percentage of gas present. The barometer was 28.86 inches 280 feet below the surface. Normal temperature of mine temperature was 57°, increased to 83°; average water gauge was 1.46, or about one-half inch.

It appears that the safer a lamp is the nearer it comes to being useless for light-giving purposes. The metallic cover around the short gauze interferes with the free burning of the lamp, from the fact that it prevents the free supply of fresh air and the consequent free outflow of the burnt gases, and the result is the lamp becomes very easily choked and extinguished.

During the months of August and September I made 100 tests with firedamp and coal dust combined under different conditions, and while I am not yet a believer in the "no firedamp present" theory in our mine explosions, I had proof enough to convince me that coal dust has been playing an important part in our past mine explosions, and that in our future mining operations coal dust should be regarded with almost as much dread as firedamp itself.

Popular Disinclination for Manual Training.

In a recent conversation on manual training, says *Iron Age*, one who is interested in the management of a small trade school complained bitterly of the unexpected difficulties he met with in obtaining the consent of parents for their boys to attend the manual training class provided for them. The school in question is designed to cultivate a taste for handicrafts in the younger lads of the eastern district, New York. The idea is to prepare the boys for eventually joining one of the more advanced trade schools with a view to entering some useful and remunerative mechanical trade, such as carpentry, painting, plumbing, sheet-metal working, etc. Instruction is gratuitous, and the hours are so arranged as not to interfere with the daily work of boys who may be in other employments. Everything is done to interest them by providing lectures and entertainments, in addition to the practical instruction. But, notwithstanding these inducements, the parents, although mostly in the poorest circumstances, do not care to have their children trained for manual labor. Their preference is that they should learn book-keeping, or in some other way be fitted for clerkships or kindred occupations There is a foolish and mistaken notion abroad, particularly among the poorer portion of the community, that there is a sort of "gentility" surrounding work in an office or a store which is not to be found in manual labor at the bench or the lathe. These silly people's ambition is to see their boys dressed in black coats, with nice white hands and linen instead of bearing the marks of honest and ennobling labor in a manual calling. They are not far-sighted enough to look ahead into the future prospects of either kind of work, and it is a difficult matter to persuade them that the best interests of their children mostly lie in the opposite direction to that toward which they incline.

Parents cannot understand that in training as mere writing machines or counter servers they are launching them on a market which is and always will be overstocked, while in fitting them for skilled labor they give them an education which, provided their moral and mental qualities are reliable, will insure for them steady and well-paying employment in the present, with the prospect of early independence and a position when they have reached the upper rounds of their trade ladder, to which not one in ten among the more stylishly appareled crowd of clerks can ever aspire. The pecuniary advantages, present and future, of the skilled workman in such trades as are taught in manual training schools are in this way infinitely superior to those attaching to the average run of clerkships. But beyond and above this consideration there is, when rightly understood, a dignity and an ennobling character about the labor of the hands which recommends to all honest and right-thinking minds as a thing to be admired, and which does not exist to the same degree in the so-called genteel occupations to which so many misguided youths of the poorer classes are devoted. The "dignity of labor," although a term too often prostituted to unworthy purposes by demagogues and agitators, so that to some noses it has acquired a stale and canting odor, is yet as true a phrase as ever gained currency. This grand expression needs to be put up in its rightful position in the sight of all the rising generation who may be inclining to bow at the shrine of kid-gloved stiff-collared gentility to the disparagement of the claims of honest and heaven-blessed manual labor.

Gold Mining in New South Wales.

Mr. J. M. Findley, of Sydney, N. S. W., managing owner of Mitchell's Creek Freehold Gold Estate, Wellington, and director of the Sunlight gold mine and the Bingera gold mine, writes as follows to the Sydney *Herald:*

Looking through the annual report of the Mines Department for 1892, recently issued, one is struck by the crucial state of affairs in the industry of gold mining which is now disclosed by the accounts for the year. It appears that the number of miners employed on gold in New South Wales is 9049 (as against over 23,000 employed in Victoria), as follows: Alluvial—3502 Europeans, 528 Chinese; 4030. Quartz—5019 Europeans. The outturn of gold was: Alluvial, 33,962 oz. 11 dwt. 21 gr. (8 oz. 8½ dwt., say 38*l.* 13s. 11d. per man); quartz, 118,149 oz. 8 dwt. 4 gr. (23 oz. 10 dwt., say 84*l.* os. 3d. per man). The total value of gold produced was 555,188*l.* 7s. 6d. (61*l.* 7s. 1d. per man); the area of auriferous ground worked was 1691¼ square miles; the number of quartz reefs proved to be auriferous is 769; the value of machinery is 570,143*l.* (an average of 63*l.* to every man in the industry); the average value of gold per oz. was 3*l.* 13s. (nearly). Though the average production per man for the year is only 61*l.* 7s. 1d. (or about half a man's wages) the proportion produced in quartz mining (viz., 84*l.* os. 3d. per man) is less unsatisfactory than that in alluvial (38*l.* 13s. 11d. per man). As alluvial is virtually extinct as a commercial undertaking (though in places it no doubt still pays some isolated fossickers), while quartz mining may, by dint of prudence, be worked into a remunerative industry, the present consideration may be confined to the latter.

The results of last year show that, taking the average value of gold from quartz at 3*l.* 11s. 6d. per oz. (which is perhaps rather over than under the value of this class of gold, on the average of the colony) the production (118,150 oz.) was 422,386*l.* by 5019 men (an average of 84*l* os. 3d. per man). Granting that the whole of this large body of men was employed for only nine months out of the twelve, their wages (putting managers, engineers, miners, truckers, etc., all together) at 50s. per week—which is the general wage for miners alone throughout the colony—amount to 489,352*l.* This shows a deficiency, on wages alone, of almost 67,000*l.*, and taking all other expenses (supplies, etc.) of carrying on the mines at two-fifths of the amount of the wages—a proportion shown by the accounts of most mines—viz., 195,740*l.*, the net loss last year of carrying on this industry appears to have been 262,740*l.*, apart from the interest on plant valued at over half a million pounds sterling. The moderate rate of 5 per cent interest on the latter would bring the loss up to 285,545*l.* In other words, every 1*l.* worth of gold raised is costing at least 1*l.* 13s. 6d. to get, and some beneficient beings are finding at least 97*l.* 10s. a year in wages to each of the 5019 quartz-miners, who return only 84*l.* apiece, leaving 67,000*l.* of their wages and 262,000*l.* odd of expenses to be provided from outside sources. The serious question arises, "Can this possibly be carried on in these times?" Money has been spent more lavishly up to the present than it is likely again to be, and has in the majority of cases been spent with the acme of imprudence on perfectly unworthy claims. Hence the shocking average result. If the industry as a whole does not at least produce the wages of the workmen. it must come to a sudden end so far as 750 out of the 769 quartz reefs in the colony are concerned. From a general point of view the only apparent solution of the difficulty is to reconstruct the industry by discarding from work the myriad of small reefs (which will hardly ever make an adequate return on capital), and by disciplining the labor and centering it on those which can be worked on a large scale, enabling them to assure the workmen of permanent employment, and to show a margin of profit. Through the volatile disposition of the New South Wales miner of the present day, it is oftentimes difficult to get those claims properly worked which would pay. The plentitude of money in recent times for prospecting and company-mongering purposes has made him nomadic in his habits and ever prone to undervalue steady work, and pursue an intangible fortune in the faith that syndicates will infallibly arise to finance his efforts. The balance-sheet of the prospecting of the past should surely now teach him to look to surer means of a livelihood. As money cannot be expected for love nowadays in gold mining, the business has necessarily to be gone about in cold blood like any other, and must show profits to justify its existence. By a judicious working for the next few years (on strict principles) of the larger claims there is a fair prospect of such creditable profits being shown as will restore confidence in the industry. At present the public in the colony capitalize it only to a limited extent, and those outside show justifiable disinclination to embark further funds on an apparently unpayable and vexatious undertaking. Where is the gratuity of 262,000*l.* to come from this year for these 5000 miners? The general wage looked for by miners in this colony (2*l.* 10s. per week) is virtually prohibitory to almost any self-supporting mine, and must inevitably undergo some abatement. As this is 5s. a week more than the standard wages in Victoria, where mining is successfully pursued, and as our claims are so much less productive than those in Victoria, the difference might not unreasonably be the other way.

Outlook in East Kootenay.

W. Pellew-Harvey, of Golden, who had the commission from the Provincial Government for assaying all specimens of ore sent from British Columbia to the World's Fair, was in Nelson this week looking over the country.

Referring to the outlook in East Kootenay, Mr. Harvey, in an interview with the *Miner* reporter, said: "A great deal of interest is being shown in mining matters in East Kootenay. On account of the low price of silver and the probabilities of good discoveries of gold quartz, this interest will probably be stimulated. The ores of East Kootenay carry silver in paying quantities, and invariably carry gold to some extent, if not always in paying quantities.

"The McMurdo basin, named after Archie McMurdo, one of the pioneer prospectors of the district, has been known for a long time to contain vast quantities of auriferous quartz. Some of the veins have been developed to a considerable extent. In one instance, on the International claim, situate at the extremity of the basin and near the Duncan river country, there have been taken a number of samples of 200 pounds each, which averaged in gold $108 to the ton.

"On the Bobbie Burns claim a great deal of work was done last summer by John E. Askwith, of Ottawa. He went to a great deal of expense in developing the property and erected a mill upon it, but lack of experience made the results less satisfactory than they should have been. The ore is a ferruginous quartz and assays $26 in gold, and it is supposed that as they proceed with the working arsenical pyrites will be found, which in previous assays carried gold in paying quantities.

"There are several other claims around these mentioned which have been bonded this season by persons representing London syndicates as well as local capital, showing that the monied men are beginning to realize that the gold properties in East Kootenay are worthy of attention, more especially so when the distance is not more than 20 miles from steamboat connection and about 18 miles distant from the main line of the C. P. R.

"On the Vermont creek, several claims have been worked, and ore is being produced and shipped. Last year Messrs. Wells and Pollock realized a handsome profit on several carloads of good silver-lead ore which was shipped to the Tacoma smelter. They are prosecuting work more vigorously this summer and expect to become steady producers.

"At the Thunder Hill mine great activity prevails. Some 45 men are engaged and 100 tons of ore are being mined daily. It is expected that the shipment of the concentrates will be made in the course of a week or two, and that from this time forth the mine will bear the reputation of being one of the first dividend-paying mines in the Kootenays.

"On the North Star 20 men are employed and several hundred tons of ore are already on the dump ready for transportation. The probability is that this summer, under the able management of L. C. Hill, the force will be considerably increased."—British Columbia Miner.

Mining in America and England.

It is interesting to note in foreign papers what visitors to this country, who are now here or have recently been here in numbers to see the World's Fair, have to say of America and its industries. Mr. Emerson Bainbridge, who has just returned from America, says that from information and observation he believes that the American mining industry now is very much as the English coal industry was 30 or 40 years ago. That is to say, Americans are able to do a large quantity of mining at shallow depths or in the hillsides, working seams of considerable thickness, and they are able to bring to bear upon this kind of mining, which has almost ceased to exist in England, all the experience and appliances of the last 30 years. The result is that a number of mines are producing coal at a cost, including everything, of about 3s. 6d. per ton, which is far below the average of the best English collieries. Mr. Bainbridge thinks it is at present premature to refer to the general conclusions he arrived at with regard to the development of mining machinery, but, generally speaking, he came back satisfied with the comparison he was able to draw between England and the United States. Unless the present high cost of producing coal in England is brought down, Mr. Bainbridge has little doubt that America will gradually develop the exportation of machinery to foreign countries, and that correspondingly England, which has long held the foremost place in this respect, will fall away. The general result of Mr. Bainbridge's enquiries with regard to the working classes in America, is that the margin between their earnings and expenses enables them to have more of the necessaries of life in spite of the extremely high cost of rent and clothes; but while the wages are decidedly higher, in many cases double what are paid in England, the workmen and workwomen have very long hours and work very hard for the wages they get.

Repairing a Train Wreck.

Under the above caption the New York *Sun* says:

Every traveler has heard the musical tapping of iron hammers upon the car-wheels as his train has stopped at some intermediate station on a long journey. Of all the sounds that assault the drowsy ear of the midnight traveler, this, perhaps, is the one that most clearly penetrates his consciousness. The heaving breath of the engine for the moment at rest, the querulous creakings with which the cars settle down into stable equilibrium upon their springs, and the confused shuffling of feet that echoes through the dim-lit vault of the almost deserted station, all make small impression upon the transient alien pausing in his half-slumbrous flight across the continent; but the clank of iron upon steel calls up a vision of the long murky aisles without, and carries with it the comforting consciousness that somebody is alert against the perils that beset the traveler in the darkness. The men whose duty it is thus to sound the wheels for possible defects belong to the car-repairing gang, and are known to their fellow-craftsmen of the railway service as "galvanizers," a sort of cant term now of unknown origin, but of clearly defined application. Whenever there is a wreck on the road, whether of freight or passenger cars, the galvanizers are among the first men called upon to go forth and do battle with the difficulty. They, with the trackmen, and such skilled mechanics as may be needed in rare emergencies, constitute the wreckers, so called because it is their duty to undo the evils that wrecks have wrought.

Whenever the ordinary citizen thinks of a railway wreck, he has a vision of passenger coaches in chaotic heaps, engines ditched, and passengers killed or wounded. Whenever a railway employe speaks or thinks of a wreck, his mental vision pictures broken freight cars off their trucks and merchandise spilled along the track. This difference of conception arises from the fact that the general public seldom hears of any but passenger wrecks, while the railway employe knows that for every such wreck reported, there are perhaps a dozen freight wrecks, news of which never gets beyond the ears of the railway workers. In spite of the tales of horror that the railways furnish, passenger wrecks are really unusual, while a freight wreck of greater or less magnitude occurs every day in the year upon every considerable line of railway in the United States. The freight wreck is the expected thing; the passenger wreck is the lurking horror in the rearward of every railway man's imagination. When the news of a freight wreck comes in, the first thought of the responsible officer is to get his track cleared, that the business of the road may go on uninterrupted. When news of a passenger wreck arrives, the overmastering thought is for the safety of the passengers. Men are hurt and killed in freight wrecks, but the members of a freight crew know how to look after one another in such emergencies, while a passenger wreck with serious loss of life or the injury of many persons presents a problem quite beyond the power of any single passenger crew.

The first duty of the crew at the scene of a wreck is to flag the wreck far enough on each side to protect it from other trains. Then all hands are set to caring for the dead and wounded, and some one is detailed to communicate with headquarters. The first man there to receive the news is the train dispatcher. He notifies the superinteodent, the roadmaster, the engine dispatcher and the yardmaster. The responsible man at the scene of the wreck has indicated as nearly as he could just what has occurred. If there has been serious injury to human beings, surgeons are dispatched at once, perhaps ahead of the wrecking train. Meantime, the superintendent, roadmaster, engine dispatcher and yardmaster co-operate. The galvanizers are called together, and so are several trackmen. If a bridge be involved, carpenters and other mechanics are detailed for the wrecking expedition. The dimensions of the bridge are known down to the smallest timber and bridge plate, and identical parts are ready to hand for loading on flat cars, aod providing the means for temporary repairs after just such accidents. New ties are within reach as well, and perhaps a flat car is ready laden with enough rails to lay 200 or 300 feet of track. The roadmaster bids his men load whatever other track material is needed. The yardmaster details a shifting engine with crew to make up the wrecking train, and head it in the right direction, and the engine dispatcher calls out a suitable eogine to drag the train. The telegraph operator nearest to the wreck is ordered to the scene, and the section men of that section are called up. Care is taken that the wrecking train shall be amply provided, and the men bring their dinner pails.

All these preparations occupy considerable time, for it is well to start out thoroughly equipped, even if the wrecking train lose an hour in making ready. It thus happens that the wreckers seldom reach the scene of a considerable accident in less than two hours after the news has been ticked into the ear of the train dispatcher at division headquarters. But if the men at headquarters know their business, the wreckers arrive fully equipped for any conditions presented hy the wreck.

The approved order of a thoroughly equipped wrecking train on reaching the scene of its work is derrick car, flat car with materials, engine, tool car, wrecking caboose and tool caboose. The train starts out with the engine ahead, but is made up in proper order at the siding nearest the scene of the accident. The immediate wrecking essentials of the train are the derrick car with a single derrick in the center, to that with one at one end or with one at each end. The elaborate steam-derrick cars now in use upon some roads are not in high favor with the veterans of the wrecking crew. The steam derrick depends upon main strength where deftness aod manual diplomacy, so to speak, would hetter serve the purpose, and it has an awkward way of goiog over to the enemy by breaking down in the midst of its work. The tool car is a perfect little arsenal of the wrecker's war material. It is a covered car, with a door at each eod and a door at each side. A clear passage is maintained between the doors. Ropes neatly coiled occupy a considerable space at one end of the car. They are usually of three diameters. On the sides of the car above the ropes hang blocks, hooks and the like, and space is kept in the same end of the car for hand and hydraulic jacks, the latter being the little giants of the wreckers' outfit, so marvelous is their strength in proportion to size. Two men may carry a jack that will easily lift one end of a prostrate engine. On the other side of each door is a box for chains. In a cellar underneath the car are stocked iron track tools, and in the roof of the car many shovels are stuck. The tools are all classified according to their uses, and each class is kept separate from all other classes. Those most in demand are placed at the most accessible points, and those that will certainly he needed at once are stowed on the front of the derrick car. Among the smaller articles are linked couplings of several sorts, blocks of curious shape, parts of blocks, canvas sacks for stowing merchandise, and grain scoops for picking up spilled grain. One of the most important tools is the horse and saddle, a device used for balancing a car over the rails while trucks are being thrust under. The tool car has a system and neatness that would delight the eyes of the careful housewife. Nothing is thrown in merely because it might be useful. There is no rubbish and no waste of space. The flat car attached to the derrick car has, besides ordinary track material, several pairs of trucks, aod in the cellar beneath a complete telegraphic outfit and a stove in sections.

As the wrecking train approaches the wreck a flagman is encountered. He is relieved by a flagman from the wrecking train, and the latter proceeds. The wrecking foreman, once on the ground, establishes telegraphic communication with headquarters, lays out his work so that no one shall be idle, and then begins at those portions of the wreck immediately within reach. The dead and wonnded, save in the worst accidents, are already cared for, and the business of the wrecking crew is merely to clear up the debris and open the line. The wrecking foreman must first decide upon the relative value of time and material. If a great railway is blocked by a dozen wrecked freight cars, the immediately important thing is to get them out of the way; but if the mass of the wreck is made up of highly valuable material it may be worth while to work more slowly and save the pieces. It was the old fashion to hasten such work with fire, but the modern rule is that no car shall be burned. In fact, an officer of the road is at hand to note the number and condition of every car involved, and all must be accounted for when the wreck has been cleared up.

All cars detached from the main body of the wreck, but hindering travel, are, if possible, put upon their wheels and rolled to a siding. Then the nose of the derrick car is thrust as close to the heart of the wreck as seems advisable, and the real work of clearing up begins. The wrecking foreman signals the engineer of the wrecking train, aod the latter must be ahle to move his engine a yard or an inch, as the signal indicates. All signals come from the foreman, and at nlght he is distinguished hy a lantern of special color. The rule is to clear one track if there be two, and thus make way for traffic. It may be necessary, however, to build a track around the wreck. The track repairers are at hand for this. They also repair the track under the advancing wheels of the derrick car as it eats its way through the wreck. If need be, rails are cut in two, so that a few feet may be gained without waiting until a full length of rail may be laid down.

There are a thousand and one devices to accomplish with ease and safety the work of the wrecker. If a single car lies across the track, impeding travel and supporting a mass of wreckage outside the rails, the wrecking foreman promptly determines whether or not he shall cut it in two, drag away the part across the track, and leave the remainder to support the wreck. Toppling cars that lean threateningly toward the track must be thrown over or propped up into stability. The wrecking train seldom or never carries an outfit for extinguishing fire, but the wrecker has his own peculiar mode of meeting the difficulty presented by a burning wreck. If, as usually happens, there is small hope of quenching the flames with water, the next resort is to scatter the burning material. A pair of car wheels is placed behind the wreck. A chain is passed over the burning mass and attached to the wheels. Then the other end of the chain is attached to the engine, and the wheels are dragged like a great dumb-bell right through the wreckage. As they come through they scatter the burning material from right to left, and by the time this operation has been repeated once or twice the flames have almost disappeared.

The derrick handles derailed cars and engines with marvelous ease. The track-repairers level the ground about the prostrate car or engine, if it be down an embankment build a temporary track down to it, and then let the derrick car get to work. The hydraulic jack usually comes into play in turning car or engioe upon its feet, but the derrick, with the horse and saddle, does the work of placing a car upon trucks. The derrick reaches round for a truck from the flat car, drops it on the temporary track, lifts one end of the car until the horse and saddle may be shifted under it, and, when a truck has been rolled under one end, lifts the other so that a second truck may be put in place. This done, the car is dragged up to the main track and run upoo a siding. An engine must be handled with greater care, and a skilled mechanic is usually at hand to see that no harm comes to its mechanism. Passenger cars need like care, because, although strong below the windows, they are flimsy in the roof. Air brakes and easily removable parts of the engine are taken off hefore the lifting begins.

All the ingenuity of the wrecker is called into play when a wreck lies at the bottom of a river, and sometimes days, or even weeks, are required to get an engine from such a predicament. Once engine and cars have been set upon their feet, a length of track laid upon a raft is sunk beside them. Other lengths of track are added; banks, and even river beds, are graded, if need be, and in time the wreck is triumphantly dragged ashore upon this temporary track.

When the work of a wrecking crew at a given point is finished, all the useless debris is burned, and such cars as will run are coupled, so that they may be hauled home for repair. The wrecking crew leaves the scene with the track smoothed out and traffic re-established. As to the wrecking train, it reaches home with all its paraphernalia in place, its ropes neatly coiled, its surplus material piled in proper order, and all things in readiness for just another such emergency.

Lixiviation of Ores in Australia.

The Australian *Mining Standard* says: Amid all the prevailing depression it is pleasurable to be able to mention one instance of success after years of patient industry. This is to be found in the case of the Pinnacles mine, Silverton. The mine is well known to investors as one io which the imposition of an excessive royalty kept back development and checked enterprise. In view of the disadvantages under which the subsidiary company worked, it is astonishing that it has survived until the present time. The record of the mine is similar to that of a dozen others. Unsuitable machinery was purchased, and it was only when hard experience had shown that wrong methods were being relied on that the management got on to the true course. The lode is a lead sulphide ore with a very small percentage of zinc, and with fair silver contents. Concentration has been mainly employed for the treatment of the ore, but the cost of transit of the concentrates and loss in manipulation rendered the process unprofitable. This experience is similar to that of the White Rock mine, where, from the time the concentrates left the mine until a return was obtained, the cost was £8 per ton of concentrates. In addition, the loss in treatment was 56 per cent, obtained despite the possession of extremely fine appliances. At the Pinnacles carriage amounted to 27s. 6d. per ton to Port Adelaide—a small item compared with that incurred at White Rock. The proposal now is to treat the large heap of tailings at the mine, the contents of which average some 11 or 12 ounces of silver per ton, by the hyposulphite of soda leaching process. The gentleman responsible for the successful application of this process to the Pinnacles ore is Mr. C. H. Beaumont, an ex-student of the Ballarat School of Mines. He has proved unmistakably what has already been learned in the United States—that leaching under conditions such as exist at the Pinnacles is the handiest and best method on which to have reliance. His experimeots were made on a parcel of ore containing 11 ounces of silver to the ton, and he saved 1098 ounces out of a total of 1170 ounces in the parcel of ore haodled by him. The loss, therefore, was only 72 ounces, which, considering that the tests were not made uoder the best of conditions, was extremely low. The value of Mr. Beaumont's experiments lies in the fact that he has demonstrated to Australians the worth of lixiviation. Every metallurgist knows that, once the roasting is done properly, the rest of the process is comparatively simple. The labor required is not skilled, and to that extent leaching compares somewhat favorably with amalgamation, where the percentage of trained men employed must he larger. The only fear we have now is that the price of silver will preclude working the mine at a profit. Doubtless Mr. Beaumont will be able soon to state the cost to which he will be put per ton of material treated, and demonstrate whether he will be able to make a profit even at the present depressed rates.

Japanese Minerals.

M. Daniel Bellet states that Japan is a country particularly well endowed with natural resources, and singularly favored in the wealth of her mineral deposits. Essentially volcanic, she not only possesses thermal resources of the most varied description, but her sub-soil contains valuable mineral deposits, and therefore it is not surprising to find the working of Japanese mines dating back to remote ages. In the seventh century there are records of mining operations, gold being worked in the province of Moutsou, iron in Bichin, and copper in Monchachi. The methods of extraction and of treatment of the ores were of course, at that period and have since remained until a very recent date, of the most primitive description. Latterly, however, perfected systems have been introduced.

If, M. Bellet says, an examination be made into the condition of the mining industries of 1878, a period at which the government prepared a series of returns showing what the resources of the country were, it will be found that 514 mines were being worked. In 29 of these mines gold was being sought for, silver in 46, copper in 91, iron in 53, lead in 8, tin in 10, antimony in 2, coal in 186, sulphur in 13, sulphate of iron in 8, and alum in 9. As regards the yield of these various mines, according to estimates which have been made, gold was annually extracted representing a value of £52,000, the silver extracted being valued at £78,000. In the case of tin, the figures were respectively 75 tons and £600, and lead 185 tons aod £4255. The iron mines yielded 5000 tons, representing a value of £18,000, and the copper mines 3000 tons, valued at £180,000. The coal mines furnished 390,000 tons annually, the approximate value of which was £390,000.

Iron ore is, it appears, found in great abundance under the form of magnetic iron, and one of the most important sources of supply is the Hei mine, which extends for several leagues and is of unknown depth. Mines of importance are also found in the provinces of Iwalsi and Kodzulse. The ores, and more particularly copper pyrites, are found in great profusion in the provinces of Rikontschiou and Ongo, aod the same may be said of lead ore, at any rat in the north of the country. Tin ahounds in the province of Satsuma, Boungo and Souvo; antimony in Ise and Hiouga. The principal coal mines are those of Karatsou and Talsasima, in the province of Hizen. Mention should also be made of the coal of Amakousa and that of Yeso. The latter island, it is said, contains a carboniferous basin of great richness and of enormous extent.

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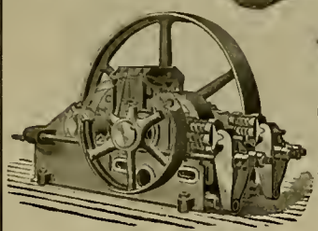

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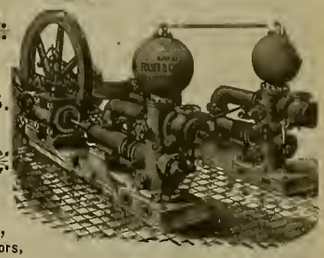

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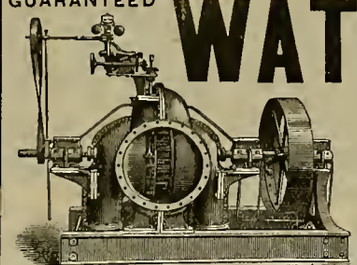

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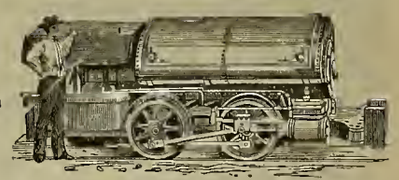

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Broken Propeller Shafts.

An interesting series of letters has lately appeared in our contemporary *Fairplay* on broken propeller shafts. We also recently noticed a patent brought out hy Mr. Mudd, of the Central Marine Engine Works, Hartlepool, for the protection of that part of the propeller shaft between the hrass liners. The inventor cases the bare shaft with an India-rubher coat, and thus prevents the water from attacking this part. We have had many plans before us from time to time to overcome this difficulty, says *Industries and Iron*, and we will attempt to describe what we deem to be the hest of them.

The covering of the whole length of the shaft with brass liners is undouhtedly the most effective way of preventing corrosion; hut the expense and the extra weight is very considerahle. Many objections are raised even to this mode of protecting the shaft, and mainly on account of the difficulty often experienced in getting the joints of the liners perfectly tight. This objection can, we think, however, be got over by careful workmanship. We have seen a shaft thus cased which, on being stripped after many years wear, looked as good as when the liners were put on. It would, however, he well to thoroughly explain the manner in which this was done.

The liners, being bored to the size for shrinking on, should be heated internally hy means of a Bunsen flame, and at the same time it is hetter to allow the liner to rotate so as to ensure equal expansion. When the proper temperature has heen reached the liner is placed in its position on the shaft and cooled in the usual manner, by allowing water to run on it and at the same time causing the shaft to revolve. When cooled the liner is turned true at the ends, and it is checked or stepped down to rather more than half its thickness, and for a width of about 1½ inches at the end where liner No. 2 is to be placed. This liner is then bored for shrinking and recessed to suit the liner fixed on the shaft. After heing heated as before, it is placed on the shaft and the junction of the two liners immediately chilled, which is hest done by providing a ring of iron harrel drilled with small holes so as to play on the joint. The remaining portion of the liner is, however, only cooled slowly. By this means the union must he effective, as liner No. 2 nips the other and thus prevents its drawing off, as was usual in the old mode of procedure. Each liner is treated in a similar way until the shaft is fully coated. We have no hesitation in saying that although this may be an expensive way, it properly done as described, it is absolutely effective.

Another way of arriving at the same end is to case the shaft with a brass tuhe, if the shaft he small in diameter. If too large for this, a sheet of hrass can he rolled up to the proper diameter, hrazed together and slipped on the shaft, after the latter has heen well coated with red lead paint, the liner being recessed to receive the tuhe. It must of course he understood that the brass tuhe is placed in position first, the end liner heing afterwards shrunk on over it, cooling the point of junction as before. On a long length of shafting there would require to be a numher of these tuhes, and they can hest be fitted hy shrinking a short liner on the shaft at the end of each. This will ensure a thoroughly good joint.

We have often wondered why, in single-screw engines, the stern tuhe has not heen dispensed with entirely. According to Lloyds' Rules, the after-peak of a steamer is made in the tank form and water-tight, so that should the shaft break and the stern tuhe he fractured, water will not enter the ship, but will only fill the after-peak tank. Given such a state of precaution, it seems unreasonahle to suppose that a stern tuhe is unnecessary. Provision can he made when horing out the stern post to put in the usual wood liner within the hrass one, and if it is thought advisahle, a stuffing-box and gland could be fitted on the inside of the post. The hulkhead at the fore end of the propeller shaft would he fitted, as at present, with the ordinary stuffing-hox and gland. The bare shaft could always be seen on opening the manhole in the top of the tank, and as this tank has the usual sounding pipes, it would be easy to ascertain if there were any large increase of water in it due to leakage of the gland. There would also be the drain-cock on the bulkhead as at present fitted, as it would be requisite to allow a little water to leak in at the after gland, in order to luhricate the packing, but no more need be admitted than is necessary to prevent undue heating. We suggest that this mode of construction does away with the use of the stern tube, and it ensures the shaft heing seen at any time the engineers may think fit, as it need not he done in dry-dock. It further ensures that the shaft is not in water all the time it is running, a state of affairs that at present exists with the ordinary stern tuhe. Many ohjections may he raised—such as that the space is confined, difficulty of access owing to the run of the ship, and various other causes of like nature; hut we venture to think that the shipbuilder and engineer, between them, would speedily find a way out of the difficulty, and devise a ready means of finding a practical solution to what does not appear to he such a very difficult prohlem.

We throw out these hints in the hope of their bearing fruit, and we shall he pleased to give puhlicity to any ideas which we may receive hearing on the suhject.

A Machine-Gun Feeder.

Dr. R. J. Gatling, whose revolving machine gun has attained a world-wide reputation, has applied a feeder for the gun, which renders it still more convenient aod useful than ever. It seems to he a perfect machine gun now. On a strip of tin, says the Hartford *Times*, are placed 20 smokeless-powder cartridges, each held in place hy hits of the tin that are turned up for the purpose. These slips are put into a horizontal opening, and, as they are drawn through, the cartridges are stripped off and placed in position to he thrust into the chambers. The motion is positive, and there is no failure in any part of the movement.

The old plan was to drop the cartridges into a vertical opening, and they were carried by gravity to their proper position. It will he seen that by this old method the gun could not be used when pointed upward or downward, except to a moderate degree. But with the new invention the cartridges are held in place in whatever position the gun is held, horizontally or perpendicularly, or at any angle. Each one of the old feeders cost $2.50. The new tin strips cost but two cents each. The new system shields the cartridge from the rain.

There is another advantage. The strips with cartridges attached can he compactly packed, and a much larger amount of ammunition can be carried with the gun than hy the old way. The gun can he fed hy these strips with the greatest rapidity. With them it has heen fired 3120 times in a minute, and when turned by a little electric motor attached to the hreech it can be fired 5000 times a minute.

The ingeniously contrived movement of this revolving gun works as easily and smoothly as the simple rolling of a wheel. It is a wonderful piece of mechanism, wonderful for its simplicity and accurate movements, superior to all other machine guns in its principle of revolving cylinder and revolving barrels and locks, at the same time moving with such exactness that in firing over 3000 charges in a minute there is no accident, no failure in the working of the cartridges. If a cartridge is imperfect (something that does not occur once in 10,000 shots), the gun works on just as accurately as if the miss-fire had not occurred.

The small hullets used in this gun, with smokeless powder, have been fired through 40 one-inch pine boards. They can he fired two miles and then have force enough to pass through the body of a man. Dr. Gatling recently exhihited ooe of his newly perfected guns before the United States Army Board of Examiners at Springfield, and they were delighted with it. Eighteen of the new guns were ordered hy the War Department, each having this remarkably advantageous improvement in the feeding.

The feeder was invented by two of the employes of the Dwight Slate Machine Company of Hartford, Ct., by which it was developed and successfully applied to the gun. The patent will later he assigned to the Gatling Company. The Dwight Company, with the aid of the Eddy Electric Company, is now busy making an electric motor to operate the feed. The invention is a very important one in the manufacture of modern ordnance, and reflects much credit upon its originators.

Band-saws for Cold Steel.

Messrs. Noble and Lund, of the Northern Machine Tool Works, Newcastle-on-Tyne, have recently supplied and put into operation in the finishing shops of the Dennystown Forge Company, Dumharton, a powerful band-sawing machine for cutting iron and steel cold. Since starting, this machine has heen engaged cutting out the center parts from forgings of connecting rods, throw-cranks, etc., and in sawing out crank webs from the solid block. Instead of heating these slabs, from which the webs are formed, and shaping them hy means of paring helow the steam hammer to as near the size as possible for machinery, they are simply sent to the planing machine, where both sides are planed and then handed over to the hand-saw, which cuts them out to the very line, leaving them as near like the figure 8 as possihle, with its edges so smooth that not more than a little filing is required to finish the work. Although the introduction of machine tools of this type does not date back more than a few years, a very large number have been installed hy Messrs. Nohle & Lund, of sizes varying in capacity for dealing with material from 8 inches to 30 inches in thickness. For these varying thicknesses the feeds and speeds are regulated to a perfect nicety, and the following, among other things, are daily operated upon: Connecting rods, crank webs, pump levers, tail-end nuts, eccentric rods, piston rods, crossheads, cutting studs and hoiler stays to length, etc., thus dispensing with the tedious work of slotting machines.

The advantages attaching to this machine tool may be thus summarized: Less power is required to drive this machine than any other for the class of work performed. It dispenses to a large extent with smith's labor, which is always expensive. The cut is continuous, and consequently no time is lost in return strokes, as in slotting. The small amount of material cut away, together with the fact that the cut is continuous, enables the machine to do from two to three times the work of a slotting machine in ripping. Work of an irregular shape can be performed on this machine, which is impossible on a circular saw. A large quantity of useful scrap comes from this machine, the higher value of which, compared with the cuttings from a slotting machine, more than covers the attendant's wages. Band-saws have been in use in Woolwich Arsenal for cutting iron plates for the sides of gun carriages for more than 25 years. Messrs. Thornycroft & Co., of Chiswick, have recently heen experimenting with one for cutting out the webs of crank shafts, and it is quite possible the idea has quite a satisfactory future before it.—The Engineer.

Scientific Progress.

Ozone.

The name of ozone has a very peculiar fascination for the puhlic. The fact is, that ozone is considered as a mysterious agent, to which all sorts of marvelous properties have been attributed about which many "fairy tales" have heen told in hooks and puhlications, some of which hear scientific repute. Another popular impression is that ozone is a new product that has only lately come within the ken of scientific men. How far from the truth this helief is is shown by the fact that, in a lecture now heing prepared on the subject of ozone by one of the leading electrotherapeutists of America, over 130 authorities are quoted, some of which date hack hundreds of years.

Although the virtues of ozone have occasionally been exaggerated, there is no denying that it can render many valuable services, not only for therapeutic or sanitary purposes, but in chemistry and in several industries. The employment of ozone will quickly become more general when it will be possihle to compress it and sell it in cylinders, as carholic acid and oxygen are now sold.

The commercial uses of ozone are innumerahle. It is useful in hleaching, as it destroys organ colors, especially in wool, cotton, vegetahle fiher, paper pulp, oils and ivory. The improvement of wines and spirits by ozonization is now commercially applied. Light wines, however, cannot be ozonized, unless the operation is conducted with the greatest care, hecause a too strong treatment gives rise to the formation of aldehydes and vinegar. The expense in ageing and refining alcoholic liquids in this way is trifling, as a very small quantity of ozone is required.

Among the physiological uses of ozone, the most important is the purification and disinfection of air and of tapestry hangings in sick rooms and in ships. In the British Museum and several public buildings in London, where large numhers of people congregate, and where the miserable arrangements for ventilation are a disgrace to a civilized community, a successful attempt has recently been made to render the air less poisonous hy the introduction of ozone. It is more than likely, too, that as soon as the difficulties which now attend the making and application of ozone are reduced, it will be freely used in churches and other places of worship, in which whole congregations now become inattentive and sleepy, often more from the impurity of the air than from the dullness of the sermon.

Ozone is also an insecticide and can be used for the destruction of caterpillars and beetles. The influence of ozone in this respect is seen on passing a supply of it through a flower pot in the earth in which some worms have heen placed. The worms almost immediately force their way to the surface. This experiment has induced some people to try to destroy the insects which cause so much damage to vines, and to have some iron pipes in the vineyards, through which ozone was forced, so as to kill the phylloxera microbe. But this will only he practical when ozone can be stored and compressed, as well as produced and sold cheaply.

As showing the effect of ozone on animals it is related that a factory was infested with rats and mice, hut as soon as it was utilized for manufacturing ozone the animals completely disappeared. The time will shortly come when the drinking water of all cities will be suhject to the action of ozone, hy which many of the ordinary bacteria, such as those of typhoid, cholera, etc., and their spores are killed. Sewerage water, or water contaminated by the refuse of works, will also he treated hy ozone, not only for the killing of hacteria and the docomposing of the ammonia into its constituents, hut for the simultaneous oxidation of all the organic suhstances in suspension.

Among the legions of uses of ozone may also be mentioned the manufacture of ferments for hreweries and distilleries and the preparation of yeast where the expulsion of hacteria leaves a pure ferment and prevents after-fermentation.—Tradesman.

Electroplating as a Fine Art.

For many years past, electroplaters have sought to evolve an effective process of electro-deposition on a non-metallic base. This endeavor was at length attended with partial success, hut the process was accompanied by so much danger, in consequence of the highly combustihle nature of some of the agents employed, that manufacturers did not care to run the risk of setting their premises on fire. A modification of the processes has heen discovered by which this danger is avoided, and the invention is now pronounced to be one of the most important that has heen introduced in the electroplate trade for many years. The object to be dealt with, whether it he a sprig of natural holly or ivy, a bit of common hedge hriar, a fern, geranium leaf, Marguerite daisy, or a terra-cotta group, it is suhmitted to the process, which is the inventor's secret. It next receives a deposit of copper, which renders it perfectly ductile and practically indestructihle, and it is then ready to be either silvered or gilt by the ordinary process of electroplating. This invention comes from England, where it is being largely employed in ornamental work of various kinds. Some of the effects produced hy it are said to he exquisitely heautiful. For instance, cracker, glove and trinket hoxes and drinking cups are twined around with sprays of ivy or holly, the veining of the leaves and the sharpness of the prickly edges of the holly heing as perfect as they were in their natural state. To other articles lace is added in a similar manner, and, while all the delicate gossamer appearance of the lace is preserved, its character is so changed that it has become metallic, and may be removed whenever the article which it embellishes requires cleaning. In the same way the ornamentation is applied to the backs of hair brushes and an infinite variety of other articles, the materials used being natural leaves and flowers. Terra-cotta ware can be treated by the same process, and, when bronzed, makes attractive ornaments, which cannot readily be hroken. —Pittshurg Dispatch.

The Saponification of Mineral Oils.

It is now known that by the action of sulphuric acid in conjunction with oxygen gas the naphthene hydrocarbons may he compelled to undergo a partial oxidation. The practical utilization of the products fully confirms this statement; moreover the noxious or hituminous substances ohtained have heen found to be oxygenated by the results of their chemical analysis. A theory has heen proposed which accounts for the existence of the solid or bituminous constituents in crude oil by oxidation under pressure in the interior of the earth. These products appear to enter into solution in the oil—at least to some extent. The presence of natural oxidation products in mineral oils, according to a recent statement hy R. Haack, increases the tendency of the oils to oxidize when treated with sulphuric acid and oxygen. From this he deduces that in working fractions it is hest to deal with those fractions which are obtained by treating the naphtha residue with superheated steam. Taking the mixed fractions which have a specific

gravity of about 0.900 and heating them with sulphuric acid and manganese dioxide, which air is forced through under pressure, there will, he says, result a product of which when purified by distillation with water in vacuo, 60.80 per cent is directly saponifiable with alkalies. The product thus exposed to air loses to a considerable extent its property of saponification; increase of temperature also brings about changes in the oils and causes them to separate from combination. Haack asserts that a soap made by observing proper precautions from mineral oil will be found to be as valuable as any soap yet made from animal or vegetable fats.—American Manufacturer.

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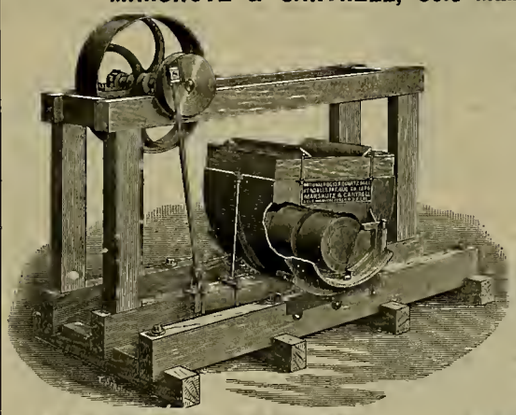
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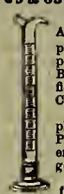
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Useful Information.

Different Kinds of Leather.

Very few people have any idea of the number of different animals which contribute their skins for the adornment of pocket-books, purses, etc., and make up the large number of odds and ends which people find so useful, says the *Trunk and Leather Review*. Monkeys, pigs, goats, snakes, lizards, alligators, sheep, calves, fish, seals and even birds all contribute.

The great majority of these skins are imported, as labor is so cheap abroad that the manufacturers here find that, even with the duty of 20 per cent on the finished leather, it is cheaper than importing the hides without duty and having them tanned here.

The one thing of importance in leather for fancy leather goods is the grain, which influences the price to a very great extent. The number and variety of grains are large, and the different leathers are classified when received accordiog to the size of the grain under these several headings—fish, morocco, grosgrain, levant, turkey, monkey, pig and seal. These grains are all different sizes, the monkey being the largest, although the pig and seal are very pronounced.

The fish grain is the smallest of all. Besides these leathers there are a great many imitations made—buffing, which is a split cowhide, and skiver, which ls a split sheepskin.

But these can be easily told, as what is called hand grain is the natural grain of the skin, touched up by hand, whereas the ordinary imitations are embossed by machine.

Several other grains made by machinery on skiver or buffing are called boarded, being made by a brass tool which gives fine straight lines close together, the others showing wavy effects or water lines on the skin and the dice grain.

The most expensive leather sells from $100 to $110 per dozen skins. This is the genuine Russian leather, which has of late temporarily lost popularity. It is in grosgrain. Levant goatskin sells for $60 a dozen skins. Seal sells for $30 to $50 a dozen, and pigskins are sold by the skins at $6.50 or $7 each. Monkey skins are cheaper, selling at $3 per skin; but these latter are very hard to procure at any price. They are made up by only one or two manufacturers that we know of in America into the very finest grade of leather novelties of the imported skins. With the exception of the sealskins, which are tanned in England, nearly all these skins are tanned in Germany, although sheepskins are tanned in France.

A very ingenious imitation of Russian leather has been made of calfskin, perfumed with oil of birch.

It is a dangerous counterfeit, for the reason that the color ls exactly the same, and the appearance and odor very much so, often puzzling the untutored buyer. Time, however, destroys the false odor and reveals the imitation.

The most important thing now, and the latest, ls to have the leather novelties which women carry to match their dress in color.

Fortunately, the houses which import leathers to this country used to send samples of leathers to Germany and elsewhere to match, so as to strike the exact color. Now, silk, cotton stuffs, plush, etc., are sent instead.

Lizard skins come largely from Borneo, as well as Germany.

How Boats Are Made of Paper.

A wooden model is prepared in exact form of the desired boat, on which the paper is molded, sheet after sheet being superposed until the desired thickness is obtained. In process of construction, nine thicknesses of strong manilla paper are laid on, making a thickness of about one-eighth of an inch. The lines of the boat are carefully drawn full size, and the paper—which comes from the mills in rolls—is cut to the full size desired for covering the entire length and breadth of the boat, so as to have no joint whatever. For racing shells the best manilla paper is used, but for gigs, dingeys, canoes and skiffs, paper made from undressed linen ls used. In manufacturing the racing shells the first sheet is damped, laid smoothly on the model, and securely fastened in place by tacking it to certain rough strips attached to its upper face. Other sheets are now superposed and suitably cemented together, the number depending upon the size of the boat and the stiffness required. Should the surface of the model be concave in parts—as in the run of boats with square sterns, for instance—the paper is made to conform to these surfaces by suitable convex molds, which also hold the paper in place until dry. It will then retain the desired form.

The model, with its enveloping coat of paper, is removed to the drying-room. As the paper skin dries, all wrinkles disappear, and it gradually assumes the desired shape. Finally, when all moisture has been evaporated, it is taken from the mold an exact counterpart of the model desired, exceedingly stiff, perfectly symmetrical and seamless. The boat, as it then appears, is waterproofed, the frames and fittings completed, and the boat varnished. The advantages possessed by these boats over those constructed of wood are strength, stiffness and durabllity; and, beiog without joint, lap or seam, they do not admit of leaking by strain or shrinkage. They do not crack or split, never shrink, and, paper being one of the best non-conductors, no ordinary degree of heat or cold affects them, thus rendering them admirably adapted for use in all climates.—Work.

How Diamonds Are Cut.

The first operation in the art of diamond-cutting is that of splitting, or cleaving. The process consists in determining the proper plan and direction for dividing the stone to give it the final shape it will assume, without needlessly sacrificing any of the weight of the stone. On the sound judgment and skill of the splitter—qualifications gained by long experience—the future of the stone depends. He decides how the stone must be shaped so as to retain the highest weight with the most brilliant effect. He examines it for flaws and defects, and must be able to know to a certainty whether the imperfections are at the surface or in the heart of the stone. Having made his decision, he proceeds to work. The rough stone is imbedded in cement and a dull edge diamond is rubbed across its surface, so as to leave an indentation that determines the line of cleavage. The operation is then repeated with a diamond having a slightly sharper edge, and finally one as keen as a razor. A marked depression is thus made, into which a sharp steel knife is inserted. A quick and light blow divides the stone into two parts. It is now removed from the cement; the main part is then replaced in the cement and another fragment is split off, and these operations are repeated until all the flaws are removed and the stone has received the proper outlines of the form it is destined ultimately to take on. The fragments are all carefully preserved, to be cut into tiny gems, and for other uses.

The next operation is that of cutting, during which the stone receives its finished outlines. This work is still almost entirely done by hand. The cntter has two diamonds attached by cement to wooden handles, and a box in which to collect the diamond dust. The cutter must laboriously grind the two stones together in order that by their mutual attrition he may develop, from the primitive form received from the splitter, the facets of the brilliant or rose form that the stone is required to take. This work requires great muscular force, and the hands of the cutter must be protected by stiff gloves of leather.

To Avoid Colds.

"There are two very simple ways of avoiding pain and colds," said Henry McIntosh, who is at the Southern. "One of these is to shut your eyes and the other is to shut your mouth. The man who comes out of an over-heated room, especially late at night, and breathes through his mouth, will either catch a bad cold or irritate his lungs sufficiently to cause considerable annoyance and unpleasantness. If he will just keep his mouth shut and breathe through his nose, this difficulty and danger are entirely avoided. Nine chills out of every ten are the result of people talking freely while out of doors just after leaving a room full of hot air, and theater-goers who discuss and laugh over the play on their way home are inviting sickness.

"It is just the same with regard to shutting the eyes. Every man who travels a long distance gets dust or something worse in his eye occasionally, and proceeds to take every one's advice to get it out, sometimes rubbing it, and sometimes pulling one lid over the other. The next time you get a speck of dust or metal in your eye just shut it and keep it shut for over a minute. Nature will then come to your relief, and there will be enough tear-like moisture to get rid of the obstruction, which will be found in one of the corners when the eye is finally opened. The worse of these two prescriptions is that they are entirely too simple. Mankind loves martyrdom in connection with medicine or surgery."—St. Louis Republic.

CONCRETE, as a material for engineering works, has, until within comparatively recent years, been chiefly confined to harbor works, but lately it has been used in the construction of railway works, both at home and abroad. The advantage of employing this material is apparent in districts where the absence of good bullding stone or clay for the manufacture of bricks makes the cost of masonry or brick structures very great.

How to go to Sleep.

The activity of the brain is in direct proportion to the amount of blood contained in the vessels of the brain, and anything that lessens the amount of blood in these vessels will induce sleepiness, while the greater the flow of blood the greater will be the flow of ideas. This is comparatively a new discovery, for it used to be held that much blood in the brain caused sleep. Dr. William Hammond has, however, demonstrated the fallacy of this latter idea by a description of the results obtained by experiments with instruments of precision, one of which was his own invention, which showed that the flow of blood to the brain was coincident with the degree of mental activity displayed in the subject.

If a person lies down, thus allowing the blood to flow more readily to the brain, and cannot sleep, let him get up, sit in a rocking chair and throw his head back and he will probably go to sleep very quickly. Some people have found by experience that they can sleep better after eating, and the doctor explained this by saying that the blood not heing able to be in two places at the same time and having to go to the stomach to digest the food has to leave the brain, and therefore sleep follows.

Some people are more active mentally when lying down than when sitting up, because of the greater flow of blood to the brain. Dr. Hammond described a machine which would produce sleep whenever desired. It is something like a pair of carpenter's pinchers with rubber balls at the end. All one has to do is to screw it to one's neck, thus stopping the flow of blood, and one can go to sleep at will, or shut off one's train of thought.

WALL PAPERS were little used in Europe before the eighteenth century, though they had been long before that applied to house decoration by the Chinese. Those that were first manufactured in the west were adaptations of design from Italian hrocades, and at first they were used in an unobjectionable manner, just as hangings of the costlier material were employed, namely: To fill spaces between obvious structural lines; and so applied, no objection could be made to thelr use. On the contrary, the invention brought it within the means of every householder to fill blank wall spaces with agreeable tracery and harmonious color.—Ex.

THE Chinese laundryman knows a little ironing trick worth trying. Instead of heating his iron just right for use he heats in scorching hot; then he plunges it into cold water for an instant, which cools the surface sufficiently to allow him to make several effective passes, the heat meantime gradually returning to the surface. If necessary he repeats this two or three times till the iron is of the right temperature to ply its vocation uninterruptedly. This saves the frequent changing of irons of Bridget's method.—Exchange.

TOOTHACHE perhaps nnmbers as many victims as headache, and is looked upon as quite the type of severe and wearying pain. Attention to cleaning the teeth, care not to use them as universal tools for cracking nuts and biting off threads, and so chipping the enamel and inviting decay, are good preventives of toothache. It is also wise to go to the dentist betimes and have hollow teeth stopped. A good digestion and avoidance of unwholesome food are great helps to preserving the teeth.

Electricity.

Storage Battery Patents.

With the expiration of the Spanish patent on the storage battery, terminating as it does the life of the American patent, it is to be hoped that the litigation will cease and work on the development of the accumulator be taken up. It is to he regretted that so much time should have been devoted to wrangling over patents that were really of no particular value to their owners. All the time and money spent by the pioneer storage battery companies in this country might better have been devoted to the development of the battery and introducing it to the public. Great stress was laid on the Faure process, and it was contended that a practical storage battery could not be made by any process that was not covered in this patent. But its owners were helpless in view of the fact that the Brush patents, which were equally valuable, were controlled by a rival concern. These corporations have been engaged in a bitter controversy for several years, and it is sincerely to be hoped that Judge Coxe's decision last week will end the senseless fight.

This decision is a ruling on the questlon of the life of an American patent being affected by the expiration of a foreign patent on the same invention. It appears, according to the judge's finding, that Faure's invention was patented first in France (October 20, 1880), afterwards in Spain (June 27, 1881), and finally in this country (January 3, 1882). The Spanish patent was for ten years, the full limit allowed for an invention that had already been patented in a foreign country. Oo the hearing recently conducted in the United States Circuit Court for the Southern District of New York, it was contended by the American owners of the Faure patents that the invention patented in Spain was not the same as that covered in the American patent. This claim was not allowed, as it was pointed out by Judge Coxe in his decision that there was every reason to believe that all three patents were for the same invention. The apparent dissimilarity in the claims were explained by the fact that Faure, being a Frenchman, wrote his original application and description in French and that they were afterwards translated into English and Spanish. Making allowance for philological differences, for errors and unavoidable changes in translation, and for dissimilarities in Patent Office procedure, it would hardlv be expected that the United States and Spanish patents would emerge from such an ordeal in identical garb, even though it were the avowed purpose of the inventor to make them the same. It was claimed in the hearing that Faure had patented one invention in France and another ln Spain, and that the French and the United States patents were on the same invention. This, however, is improbable, as the term of the Spanish patent shows. Had the invention, which the Spanish patent was intended to cover, been an "original invention," that is an invention that had not before heen patented in any foreign country, it would have been entitled to protection of the Spanish patent laws for 20 years. As a matter of fact, the application was made for a 10-year patent, showing that it was the belief of the inventor that he was applying for a patent on the same invention as that covered by the French patent. This is the view taken by Judge Coxe, and it seems to be supported conclusively by the evidence.—Western Electrician.

Mr. Edison Hates a Telephone.

"What makes you work?" I asked with real curiosity. "What impels you to this constant, tireless struggle? You have shown that you care comparatively nothing for the money it makes and you have no particular enthusiasm in the attending fame."

"I like it," he answered, after a moment of puzzled expression, and then he repeated his reply several times as if mine was a proposition that had not occurred to him before. "I like it. I don't know any other reason. You know some people like to collect stamps. Anything I have begun is always on may mlnd, and I am not easy while away from it until it is finished. And then I hate it."

"Hate it?" I asked, struck by his emphatic tones.

"Yes," he affirmed, "when it is all done and is a success, I can't bear the sight of it. I haven't used a telephone in ten years, and would go out of my way any day to miss an incandescent light."—From C. D. Lanier's sketch of Thomas A. Edison.

A SPECIAL ELECTRIC WELDING CAR has been constructed at Philadelphia for welding street railway rails in position. The car is provided with an electric welding plant, so constructed that current is taken from the trolley wire and transformed into a low-tension current of desired strength. Experiments have been made at Johnstown, and rails of great length have been formed, avoiding the use of fishplates and joints, at the same time obviating the necessity of bonding the track for the return circuit. On the West End Company's track a girder rail, 25 inches square section, was welded wlth 100-horse power, and the usual rails require less power. The time taken is from four to sixteen minutes for a complete weld. The rails are welded in places by removing the paving and making contact after connection to the terminals of the welding machine.

THE MYOPHONE.—M. Brown Sequard has recently addressed a communication to

the French Academy, in which he describes an important discovery of M. d'Arsonval. It has generally been assnmed that the electric excitability of muscles ceases shortly after death. This statement is true as far as their ability to contract is concerned; but all such observations have entirely failed to take account of muscular movement of feehle intensity. In order to stndy these muscnlar vibrations, M. d'Arsonval has for several years employed a magnetically adjustable microphone, which he calls a "myophone." This instrument produces a sound long prior to a nervous excitation snfficiently powerful to create a visihle muscular contraction. By means of this apparatus, M. d'Arsonval has been enabled to prove that a nerve remains alive for hours after death. This is easily demonstrated hy attaching, say, the Archilles' tendon of a guinea-pig or a rabbit to the myophone and then exciting the sciatic nerve by means of a current intermitting 50 to 100 times a second. Snch tests show that the nerve can and does act upon the muscle, without necessitating its visible contraction, and that a distinct muscular vibration takes place. It also proves that a nerve dies much slower than has been currently helieved.

ELECTRICITY AS A PURIFYING AGENT.—Electricity seems to be coming prominently to the front for use in purification processes. It has been successfully introduced in France and England for purifying sewage, and if worked with a refuse destructor, in which the heat can be used for generating the current, it is thonght it will be found not only more satisfactory hut more economical than existing methods. In Germany an electrolytic process for purifying mercury for use in very accurate work is coming into general use. A new method of bleaching starch by electricity is also reported, by which, it is said, second and lower qualities of the product can be treated electrolytically, so that they compare favorably with the first quality. Methods of manufacturing ozone by electrical action are also well known. In fact, it seems as if the electric current was destined to play a very important part in the sanitary engineering of the future.

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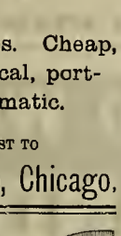
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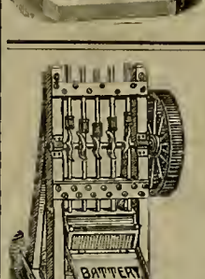

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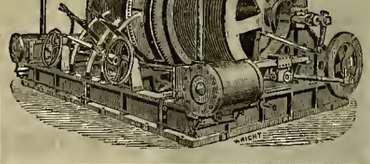
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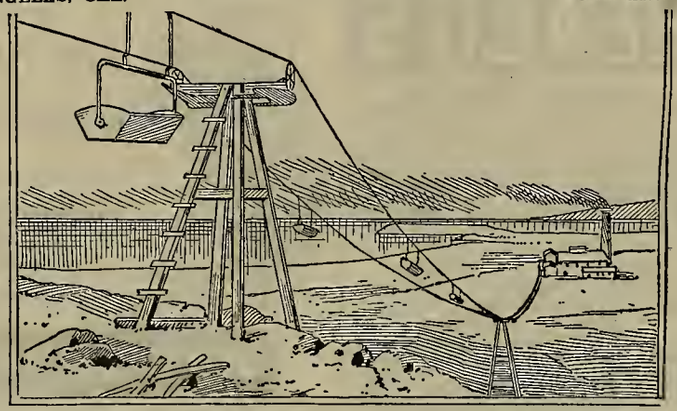

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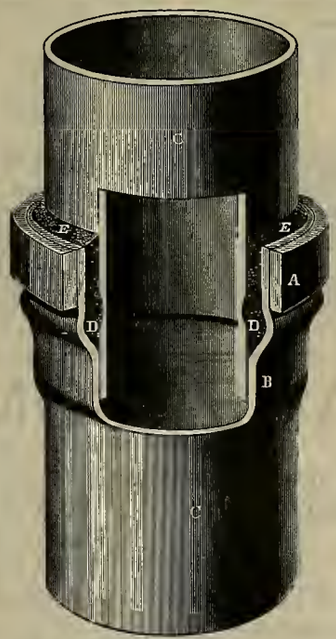

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B—Bell End Pipe.
CC—Body Pipe.
D—Lead Space, showing Patent Lock Joint.
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CALIFORNIA.

Amador.

THE IRMA.—Amador *Record*, Aug. 3: It is less than 12 months since the first work was begun at the Irma mine under the direction of C. Shea and David Fisher, the former being general manager and the latter superintendent. To-day the mine is paying its own way and more too—a rapidity of development almost unprecedented in California mining history. But one can readily understand the secret of this phenominal success by visiting the locality. There has been no filigree work about the operations. Everything from mine to office is of the plainest and yet of the most substantial character. The head managers live and lodge just as well and no better than their men. Every one about the mine, manager, superintendent, foremen, men above and below ground, each and all work as though they took an equal interest in the success of the undertaking. Sixty men are now employed directly and indirectly about the mine—30 underground and the balance on surface and timber work. The working force is being added to from time to time as circumstances will permit. No liquor is sold in or around the camp. The Irma folks, as well as employes and the balance of the population in Pioneer district, are strenuously opposed to any liquor business getting a foothold in the camp.

A NEW MILL AT THE IRMA.—Amador *Record*, Aug. 3: A new and powerful air compressor for the Irma has been shipped from the East, which will enable them to operate three additional Ingersoll drills. This will make a total of five drills driving ahead work underground. The company has not erected any mill yet, but a daily output of 16 tons of ore is crushed in a Bingham roller mill owned by Charles Gracey. This mill is a new invention, and is the first and only one ever built. It works very satisfactorily, both as to the amount of power requisite to operate it and the effective manner in which it reduces ore. The invention is an undoubted success and will be heard from. Two Frue concentrators are also connected with the plant. The Irma ore yields 15 per cent of high-grade sulphurets. There are many things concerning the Irma that space forbids us to speak of this week, but, as this is to be a continued story, our readers will hear something further upon the subject. There are several prospects in that immediate locality which look equally as promising as the Irma did six or eight months ago. These we will speak of in detail in another issue.

THE CLINTON.—*Ledger*, Aug. 4: Street rumor has it that Superintendent Rogers received about a thousand dollars last Friday night with which he intended to pay off some of the labor bills at the Wieland mine, but that, as that amount would not pay more than one-third of the indebtedness, he concluded to await the arrival of the attorney of the mine—Samuel Shortridge—who is expected up daily with the money to settle up the entire indebtedness of the company. Attorney Shortridge and R. P. Wieland arrived in Jackson Wednesday night and went on to Wieland yesterday morning. Mr. Shortridge is attorney for the Clinton Consolidated Company and came up to look over the financial condition of that concern. He says that every dollar of indebtedness will be paid, and that in all probability work will be resumed on a larger scale than ever before as soon as the affairs of the company are again put in shape.

REDEEMING THE AMADOR GOLD MINE.—*Ledger*, Aug. 4: Last Saturday Vincent Neale and James E. Dye redeemed the Amador gold mine property, which was sold by the sheriff six months ago for about $9000. Mr. Neale represents the corporation known as the Jackson Gold Fields. The sheriff's deed to the property cannot pass for 60 days, and the American Company is still in possession with its armed guards.

FOR A WATER WHEEL.—*Ledger*, Aug 4: T. Dodd, the inventor of the Dodd water wheel, was in Jackson during the week looking over the Alma mine with an idea of securing a contract from the company for the Union Iron Works.

ALMA GOLD-MINING COMPANY.—*Ledger*, Aug. 4: The Alma Gold-Mining Company has been incorporated for the purpose of sinking a shaft in and prospecting the ledge which runs through the Mattley field about northwest and southeast, which is the same ledge the Kennedy is located on. The company propose to sink the shaft 500 feet without crosscutting. The capital stock of the company is $1,000,000, composed of 200,000 shares at $5 per share. The directors of the company are Geo. B. Heazelton, president; J. N. Wells, vice-president; D. Gutman, secretary; W. B. Hamilton, H. H. Bodwell and J. B. Francie. Mr. Francie will be the superintendent of the property. The machinery will probably be run by compressed air, the compressor being placed on the creek, and conveying the air to the mouth of the shaft on the hill. The compressor will be run by water power, the water being taken from the top of the hill, which will give a pressure of 240 feet. They propose to get to work in 10 or 15 days. The company has sufficient money on hand to successfully prosecute the work it has planned.

Butte.

LIVELY MINING TOWN.—Marysville *Democrat*: W. W. Lemon of Forbestown, says the people of that mining town are in a prosperous way, in fact they are entering a stage termed a boom. The greatest trouble they find at present is in not being able to get good-seasoned lumber as fast as required for building. The Stow mine is keeping a 40-stamp mill at work continuously, and the Nickerson mine has a good 10-stamp mill at work. In a few days the Hayward mill commences the crushing of quartz and ore, of which there is a large quantity all ready for use. This will keep 30 stamps pounding away night and day hereafter, making 80 in all.

Calaveras.

THE JONES MINE.—*Mountain Echo*, July 29: The Jones mine, situated at the month of Carson creek, seems to be coming to the front as a gold-producer. The mill is kept going steadily, with good results. Drifts are being run and every effort is being made to develop the mine. Mr. Roberts is entitled to much credit for the splendid manner in which he has managed this property. His economical mode of managing the mine is sure to make it a success in the end.

THE PARTICELLI MINE.—W. T. R. writes to the *Chronicle* from Deer Lodge Camp, Aug. 1: The crosscut in the Particelli mine, 200 feet from the month of the tunnel, has been pushed in 34 feet to the hanging wall. Four feet of quartz was found on the hanging wall that will mill possibly $5 per ton. My company henceforward will develop the property by sinking a vertical shaft east of the ledge, with a view to encountering the vein on the 500-foot level. The order is here to commence the sinking, and accordingly I have started the shaft. It is the intention of the company to erect a water-power hoist next month.

AT THE HOLLAND.—*Citizen*, Aug. 5: The Holland mine is progressing rapidly. Sinking is steadily going on, and the hum of the mill is daily heard. Everything in and around the mine is working well, and its effect can be felt in our whole community, as quite a number of men are employed, and at every regular payday your money is there, enabling the employes to get their money, which is put in circulation, thereby causing smiles among our citizens.

STRIKE IN THE LINDERAXA.—Calaveras *Chronicle*, Aug 5: A large body of rich quartz has been struck in the Linderaxa mine about two miles from this place and owned by Tynan & Vandell. A tunnel has been run on the mine a distance of about 200 feet, at the end of which a winze has been sunk a distance of about 50 feet. Tynan & Vandell started a crosscut west about ten feet down from the top of the winze, and, after running eight feet, struck the vein, which is exceedingly rich, the quartz carrying free gold in large quantities. It will be a few days before the width of the vein is known, owing to the fact that other developments will have to be made in the mine before the work of crosscutting can be continued, but there is not the least doubt but that Tynan & Vandell have struck a regular bonanza.

Humboldt.

LOCATIONS FILED.—*Advocate*, Aug. 5: Mr. J. C. Bush has filed for record notice of location of the Bush placer mine and Mr. Lewis J. Nelsen notice of the location of the Lewis Nelsen mine, both in the Redcap mining district. There was also placed on record in the office of the Auditor and Recorder this week a deed from P. L. Young and J. A. Pearch of 20 acres of land near Pearch's creek and the Klamath river.

THE GOLD BLUFF PROPERTY.—Blue Lake *Advocate*, Aug. 5: Announcement comes that the recent sale by Mr. John Chapman to Nevada mining men of the Gold Bluff property means the immediate vigorous prosecution of operations there. It is learned that while Superintendent Coffin, the owner, will have general supervision of the work at the mine, operations on the beach will be in charge of Mr. Edward Ellis of Arcata, whose familiarity with all that appertains to the working of it renders his services well nigh invaluable. New machinery will be put in and no expense spared in the effort to make it pay. Mr. Hightower, also a Nevada man, will be associated with Superintendent Coffin in the working of the auriferous sand.

Mariposa.

MAY BUY A MINE.—Mariposa *Gazette*, Aug. 5: Mr. M'Caw of San Francisco, accompanied by several practical mining men, arrived here Wednesday on their way to Hite's Cove. Mr. M'Caw was here several weeks ago and made a close inspection of that once-noted property. Mr. Hite is waiting at Pine Glen until Mr. M'Caw returns to determine whether or not he would purchase the mines. So much valuable machinery is lying idle in the Cove, and so much gold is known to exist there that it is very sad to think of the inactivity which prevails. The working of the Cove property means so much to this county that all of us will anxiously await the expert's decision.

Nevada.

TO REOPEN THE STOCKTON.—Grass Valley *Tidings*, Aug. 4: The Stockton mine, located on Dawson Handy's ranch, about ten miles south of Grass Valley, is to be reopened by Sacramento and local capital. The mine has paid well in the past and a shaft 120 feet deep has been sunk on the property. Four thousand dollars were extracted from one "pocket." J. H. Burrows, a mining man from Colorado is to be superintendent.

TO WORK THE PINE HILL.—Grass Valley *Union*, Aug. 7: A number of practical miners who have secured a bond on the Pine Hill mine, located in Rough and Ready township, met last night at the office of Justice Paynter and elected Thos. Loney, president; S. T. Jones, secretary, and Chris Loney, treasurer, of the company. The mine has been bonded from the owners, Messrs. Thrasher, Riddinger & Co., and active work will be at once commenced. It is proposed to drive a tunnel and tap the ledge 150 feet from the surface. Crushings of ore extracted from the mine have yielded at the rate of $7 to the ton. Even at this low rate the mine can be worked at a profit. It is a good prospect.

BRIGHT PROSPECTS.—*Transcript*, Aug. 7: The Badger Hill quartz mine, in Cherokee district, was started up last week. There is a shaft 100 feet deep on this mine at the bottom of which there is a good ledge. Drifts are being run from the shaft, and the prospects are very flattering. As soon as the drifts are opened sufficiently, which will not be long, a much larger force of men will be employed. The last crushing paid $20 per ton, and the quartz now being taken out looks much better than the last lot. The mine is owned by an English company. There is a good hoisting works and rig on it. David Keskeys is the superintendent. There are several prospects in that vicinity that are looking well.

LOOKING FOR MACHINERY.—*Tidings*, Aug. 4: Stephen Moore, superintendent of the Home mine, on Deer creek below the Champion, was in Grass Valley on Wednesday looking for machinery to put on the mine. Mr. Moore formerly resided in Grass Valley, and for a time had charge of the North Star mine. The Home Company, we understand, will put up its works on the opposite side of the creek, not far below the Providence mine.

A NEW DEIFT.—Nevada *Herald*: The Odin Company are now running a drift for their main channel, a job which will take about two months and a half. The gravel now coming out is improving and averages $1 per carload. When the drift is completed the machinery is to be rearranged, and various changes will be made.

NEW GRAVEL MILL.—*Herald*: Oscar Brown is almost through with the new mill at the Kate Hayes mine, French Corral, and is now building a tramway for it. The mill is a heavy one, with ten 1000-pound stamps and a six-inch cam-shaft. It is calculated to grind up the cemented gravel which escapes the elevator, in a thorough manner. Mr. Brown expected to have the mill ready for business by the 10th inst.

Placer.

BIG SALE OF MINING PROPERTY.—Placer *Republican*, Aug. 4: News has just reached us of the sale of the Three Stars and other mining property in the Ophir district to a Denver company. The sale is by Mr. B. F. Hartley, and includes the Three Stars mine, the Belle Hamlin mine, the Lamhert & Rhoades mining property and the Almont mining property. The purchaser is the Colnmbia Gold and Silver Mining Company of Denver, Colo. The deed was made on June 27th, and was filed for record in the recorder's office here on the 26th of July. This is one of the largest sales of mining property ever made in the county, and the many friends of Mr. Hartley will be glad to hear of his success in disposing of his mines at such a handsome figure. This sale will have a very beneficial influence upon other mining properties in the Ophir district, and those in other sections of the county as well, and we may expect to hear of other good sales almost any day. Mining men in the silver States are casting about for gold-producing properties, and particularly quartz, and all those who are fortunate enough to own a gold-bearing quartz ledge may consider themselves possessed of a young bonanza.

Plumas.

BETTER TIMES AT JOHNSONVILLE.—*National-Bulletin*, Aug. 4: Benj. L. Jones arrived from Johnsonville Sunday evening and on Monday proceeded to the Golden Key mine at the head of Rush creek, owned by himself, M. L. Moore and Jack Owens. Three years ago the owners extracted and crushed 60 tons of ore, from which they realized $9 per ton. Mr. Moore is expected to return from Shasta county, and development work will be resumed on the Golden Key. Mr. Jones reports times improving at Johnsonville. About 30 men are employed at the Jamison mine and they are a class which help a town. The prospects for the mine seem to be improving. The Squirrel Creek mines generally are supposed to have done well the past few months.

THE FOREST GROVE MINE.—*National-Bulletin*, Aug. 4: During the past three months Messrs. Jones & Curtis have been ground-sluicing in their mine, the Forest Grove, situated about five miles west of Jonsonville. Only three men were employed in the mine, yet the cleanup amounted to $3300, nearly all of it being coarse gold, the heaviest piece weighing five ounces. This is a very respectable amount of gold to be obtained in so short a time from a small mine operated in a small way.

SUNNYSIDE DRIFT MINE.—*National-Bulletin*, Aug. 4: This property is owned mainly by Beckwith people, and is situated about nine miles southwest of Johnsonville, on the line between Plumas and Sierra counties. Three men are now at work running a tunnel to tap a back channel. This tunnel is now in 765 feet. The company expect to drift 100 feet farther and sink a shaft for the purpose of testing the depth of the channel, the rim of which was cut, but the bedrock pitched away to such an extent that a new and lower tunnel will be necessary. The gravel encountered at the rim prospected well. Prior to 1891 a break from this channel was operated as a hydraulic mine and yielded up to that time $75,000, and that at an expense of only $9000. Some astonishingly large nuggets were secured, the largest weighing $3270, another $1800, another $1500, another $1000, and several as large as $500.

MINES AND DITCHES SOLD.—Plumas *National*, Aug. 3: Last week Col. M. H. Day of Rapid City, South Dakota, purchased of the Lee Bros. of this place, the Hungarian Hill mines known as the "Orr," "Lady Emma" and "Cate" claims, together with water-rights connected therewith. For several days Col. Day, and F. B. Lathrop, who is interested with him, were examining that section of country and the territory lying between it and the Bell mius. Being fully satisfied as to the merit of the property, the purchase was made and the money counted out to Mr. Lee. By securing this property, Col. Day is in a position to build up one of the most important water privileges in the county. The ditches and reservoir are to be so improved as to husband and carry a large volume of water, probably 2000 inches, which will be piped across the Spanish Creek canyon and delivered into a ditch on the north side, to be cut for the purpose of conducting it to the Bell mine, there to be used for the generating of power. Evidently the company means business. It proposes to develop its rich property. Col. Day has had much experience in mining in the Black Hills, where he is now operating a 40-stamp mill. The inauguration of work upon its valuable property means a revival of business in this part of the county.

Shasta.

EXTENSIVE COAL DEPOSIT.—Redding *Free Press*, Aug. 5: Joseph M. Frazee, a man of considerable experience in coal-mining, brought in some coal specimens this week from a mine in Trinity county which he discovered 30 years ago. While the specimens are admitedly of a poor quality, being broken from an outcropping long exposed to rain and shine, Mr. Frazee is of the opinion that a little work on the vein will develop a much better quality of coal, fit for smelting and other rough work. Mr. Frazee expressed the conviction that the vein of coal extends from the Round Valley reservation parallel with the Coast Range mountains to Coos bay in Oregon. A good quality of coal is mined at Coos bay, and there is no reason to suspect, if the vein is so extensive as Mr. Frazee is convinced it is, that some or even a better grade of coal may be found on the same zone in Trinity county. As it rests at present, it is absolutely of no value to any one, being far from lines of transportation and almost inaccessible.

TO PUSH WORK.—*Courier*, Aug. 5: Charley Albro, who was down from the Hidden Treasure mine Sunday, says that the work on the mill is being pushed ahead rapidly. The mill will be a ten-stamp one.

Sierra.

WORK ON THE LAWLER.—Forest City Cor. to *Messenger*, Aug. 5: Supt. McIntosh, of the Mt. Moriah mine, better known as the Lawler, returned a few days since from below, and on Tuesday, Capt. V. S. Snider and a Mr. Woods came up from San Francisco to inspect the works. The contracts let to run three tunnels at different depths to cut the main ledge have resulted in two of the tunnels cutting two other ledges before they reached the main one. One of these ledges was 3½ feet wide and the other 10½ feet wide, both showing free gold. On Tuesday the main lode was reached in one of the tunnels, and up to this time 3½ feet had been made and the footwall not yet reached, showing free gold all through. This lode has shown the best development of any one in the county or country so far as it has been prospected. The owners of this property can see a fortune within their grasp. Mr. Newton, superintendent of the Gold King mine, is putting up his hoisting works, and will be ready for sinking soon. This a good piece of property also. The Rising Sun mine has but few men at work, but it is thought they will soon put on a full force. This property is without doubt among the best in this section. It is generally conceded here that the South Fork mine will be opened up through the old Bald Mountain extension tunnel, which will give new impetus to our town. There are thousands to be secured for the owners through this enterprise.

Siskiyou.

QUARTZ AND RIVER-BED MINING.—Yreka *Journal*, Aug. 2: Gould & Co., who are now working the Hegler Bros.' quartz mine on Humbug, have started the mill in crushing, and have plenty of quartz in sight to keep the mill running steadily. In fact, they have a great big ledge and a small mill, which will be replaced by a large mill if further developments show that the ledge holds out in extent as at present. The quartz prospects well, and the company expect to realize considerable gold during the present summer and fall season. The loss of the big current wheel at the American Bar claim, Klamath river, near Hornbrook, which was expected to prove a failure, has caused the company to resort to the use of small current wheels for operating the machinery, and expect to commence washing pay gravel within a couple of weeks. The wheel for working the pump is already in place, and the wheels for the derricks and sluices will be completed in a few days. This claim prospects very rich wherever the bedrock has been reached, and will no doubt yield handsomely during the balance of the season while the river is low and the weather favorable. Several more claims have been located in the new Butteville mining district on Eddy mountain at head of Shasta river, about seven miles west of Igerna, which is destined to become a flourishing district. A custom quartz mill would be a good investment, to receive liberal patronage from the various quartz-mine workers and owners in that section. The Eastlick Bros.' mine at Oro Fino has been paying better this year than usual, owing to a good supply of water. The last clean-up yielded over $15,000. The R. H. Campbell hydraulic mine in Quartz valley, bonded to an English syndicate, is also yielding handsomely, the ditches supplied from Salmon mountains furnishing an abundance of water for active operations. C. L. Smith, of Ashland, says the *Tidings*, who is working at the Centennial river mine, on the Klamath, about 30 miles below Henley, is interested in a promising location near that place—a six-foot

ledge from which $40 asseys have been obtained. The same papsr also says Col. Ewing went over to the head of Empire creek in Siskiyon county the first of the week, with ex-Mayor Grainger, to exemine the Blne Jey mine, owned by Poole & Grainger. The Blue Jay is a big ledge, in which ore assaying over $15 to the ton was struck last week. Dele & Co., who discovered a good ledge of quartz in ths mountains at head of Sheste river in this county, writes as follows to the editor of the Ashland *Tidings* concerniug its charecter: "I thought you might be interested in knowing that Dale & Co. heve strock it rich in quartz that assays $628 in gold and 39 onnces of silver to the ton. The location is ebout 30 miles from Sisson on Eddy mountain. It has raised a big excitement in this part of ths conntry. My claim is near that of H. B. Maxwell, who sent to Philip Mnllen some qnartz that went $600 to the ton. It is the most eingnlar mine I ever saw, and I cannot find any one who ever saw auything just like it. Break up a bowlder of quartz, and you find in it pockets three to five inches in diameter filled with solid metel which breaks up in cubes and ie of the color of iron sulphurets. The same stuff comes from the quertz in smaller particles when pulverized in a mortar. I seud you a sample of it in this letter. I was offered $10,000 for my claim, but declined it. I have some of the metal like I send you that will assey $1000 to the ton. We heve done only two or three days' work on our claim."

Borax ann Saltpetee.—Yreka *Journal*, Aug. 9: Reed and Whitcomh have teken up land at the lake section elong the Oregou bonndary line in Butte creek valley for mining purposes, to procnre borex and saltpeter, snoposed to exist in large quantities in that locality. The alkaline flats on the borders of the Little Klamath and Tule lakes seem to be of the same character as the horax fields of the sagebrneh plaine of Nevada and other States of the midway basin between the Sierra Nevada and Rocky Mountain ranges, and will likely produce borax and saltpeter to a great extent. The people of that section have often procured large quantities of the alkaline salt from a selt spring or marsh bordering on Little Klamath lake, for the pnrpose of feeding it to sheep, also borax in a crnde state, which they found effective in scrubing floors and cleansing, and it is possible that a good quantity of soda might be fonnd in the same locality.

Quaetz.—Boyle & Co. have beeu taking out $40 to $50 per ton lately at their ledge on head of Humbug creek, but the ledge being narrow, only eight inches wide at surface, tbey are uow running a lower tunnel to strike the heart of the lode where it is wider and will pay better at less expense. Boyle has about 18 men at work, and expects to put on more hands this week. He has also the option for a year of reopening the old Soencer mine, just below the Eliza ledge, which yielded over $100,000 nnder former management, but worked to such disadvantage that the expenses were too great. An experienced man from below, named Oliver, will examine the mine to ascertain the feasibility of running a tunnel into the mountain, as the method of sinking shafts and pumpiug ont water is too slow, tronblesome and expensive.

Blue Geavel.—The Greenhorn blne gravel claim, about a mile south of Yreka, is now paying handsomely. The miners cnt throngh a rim last week, and had to sink down three feet lower in a new back channel, which contains the same kind of rich blne cement, snch ae was realized on the first opening of the claim near Lee's dwelling-house. The indications look favorable for realizing considerable gold from now on, which everybody hopes will be the case, in order that the men interested may get back their money exnended, with good reward for their energetic and persevering efforts in the way of developing the extensive blne-gravel beds of Greenhorn creek and this vicinity, 100 feet beneath the snrfece of Yreka basin. George Graves & Co. have been meeting with very good success in quartz prospecting on Cherry creek during the past eummer, and are now working a pocket ledge that pays well, which may develop into a permenent ledge.

Trinity.

A Pesperous Season.—Trinity *Journal*: The mining eeason of 1892-3 can be classed as beiog one of the best for a great number of years. The waterfall wae considerably above the average, and the placer-miners have utilized it all, with the exception of a few heavy storms, when the water in the ditches had to be turned out in order to prevent them from breaking. In very few instances damages were reported to reservoirs, flumes or ditches. On the whole, though, when compared with those of former years, the damages were perceptibly slight, as it did not take long to repair them, and conseqnently but a few days' water was lost. Some of the mines have cleened up, showing good results. Others, with more water at their command, will not finish the season's clean-up before the latter part of Angust or the first week in September. Trinity's contribution to the gold output of California this season will be a large one—perhaps the largest for many years.

Looking at Mines.—Trinity *Journal*: S. M. Spragne and W. R. Mortou of Iowa Hill, and Geo. H. Magruder of Yuba City, prominent mining men, have been in Trinity Center for several days looking at the mines in that neighborhood, and are very favorably impressed with them. They went over to the Ward mine (recently sold to Denver and French capitalists) as the guests of P. M. Paulsen, and spent a day there. Mr. Sprague, who is a placer-miner of great experience, and the rest of the party were more than snrprised at the magnitude of this property. Mr. Sprague said he never expected to find such a mine in Trinity county, and that it would rival the famous North Bloomfield, both in richness end extent. These gentlemen are of the opinion, and correctly, too, that the mines of this county are yet in their infency.

Tuolumne.

Rich Steike Reporteo.—*Democrat*, Aug. 5: It wes reported in town Tnesday that a rich vein of ore had that day besn discovered in the north shaft of the Rawhide mine. The extent of the hody of ore or its richness could not bs learned, but it is generally accepted es true that a rich strike hes been mede.

NEVADA.

Washoe District.

Con. Cal. & Va. Mine.—Virginie *Chronicle*, Aug. 5: 1500 level—On the sill floor have reopened the main south drift a distence of 60 feet; total length reopened, 86 feet—to a point 256 feet distant from the main shaft. At a point in this south drift 256 fest from the main shaft we are cutting out a station for an upraise. Have done some repairing to the main north lateral drift from the Con. Va. shaft. 1600 level—The south drift sterted at the end of the east crosscut run east from the main sonth drift on the 1500 level, has been extended 16 feet, continuing in porphyry and quartz of a very low assey valne. Have continued the work of bulkheading end closiug the openings which connect with the old stopes in the north end of the miue where ges exists, and the escape of the gas is growing less. 1650 level—Have continued making necessary repaire to the drifts on the sill floor of this level. Heve resnmed work on the north and south sides of the drift rnn east (at a point 20 feet down) from the winze snnk from the crosscnt run west from the main northwest drift; also upward at the end of the drift run eouth from that winze at a point 52 feet down, and have extracted from all these places during the week 163 carloads of ore—about 158 tons. Have shipped to Morgan mill during the week 184 390-2000 tons of ore, the average assay valne of which (per car samples) was $36.70 per ton. The average assay value (per battery samples) of all the ore worked at the mill dnring the week (71 tons) was $33.82 per ton.

Ophie.—1565 level—An east crosscnt started from the main drift ou the sill floor of this level, at a point 108 feet south from the winze etation, hae been advanced 9 feet. Have reeumed (jointly with the Mexican Compeny) the work of making repairs to the main shaft.

Mexican.—On the 1565 level—The east crosscut from the north drift from the crosscut rnn east from the bottom of the winze, has been extended 19 feet; total length, 154 feet, in a porphyry, clay and quartz formation showing a little valne.

Utah.—340 level—The south drift from west crosscut No. 3, at a point 100 feet in from its mouth, hes been extended 8 feet; total length 37 feet; continuing in qnartzite and porphyry formation of low assay value. Have stopped work in the south drift and are removing track therefrom.

Sieera Nevada.—The intermediate tunnel on Cedar Hill has been advanced during the week 12 feet, making the total length 515 feet; the face ie in porphyry. The north drift started at a point 1520 feet west of the joint Sierra Nevada and Union shaft has been advanced 30 feet; face in porphyry.

Union Shaft.—The north drift etarted on 900 level, at a point 1520 feet west of shaft, hes been advanced 30 feet; face in porphyry.

Andes.—On 420 level eest crosscut from main lateral drift, north, was advanced 12 feet; total length, 24 feet; face in qnartz that yields low assays.

Gould & Curey.—200 level—West crosscnt No. 5, started in northwest drift, 432 feet from main west drift, hes been advanced 7 feet; face in hard porphyry; total length, 557 feet. We have also done some necessary repairing during the past week on the 200 and 400 levels. Sutro tunnel level—The joint north drift, which was started in east crosscut No. 1, 75 feet from main north drift, has been advanced 16 feet; total length, 80 feet. All work has been discontinued in this drift for the present.

Halr & Norgoss.—On 900 level have advanced the south drift 10 feet; total length, 141 feet; face in porphyry. Have discontinned work in the face of the drift and started a new west crossut at a point 41 feet back from the face and advanced the same 10 feet. Face of crosscut in porphyry. 1100 level—Heve advanced the sonth drift 8 feet; total length, 136 feet; face in porphyry. Have discontinued work in the face of this drift and started a new west crosscut at a point 76 feet back from the face and advanced the seme 10 feet; face of crosscut in porphyry. Main shaft—During the week have been easing timbers in main sheft below the 1100 level and have put in new guidee in the two hoisting compartments from the 1100 to the 1300 level.

Best & Belchee.—200 level—At a point in northwest drift, 295 feet from onr sonth boundary, we have started east crosscut No. 2 and extended the same 20 feet, passing through quertz and porphyry giving low assays. Sutro tunnel level—The joint north drift, which was started in east crosscut No. 1, 75 feet from main north drift, hes been advanced 16 feet, passing throngh soft porphyry; total length, 80 feet. All work in this drift has been discontinued for the present.

Chollar.—Are retimbering the main tnnnel on 250 level and repairing the main incline between the 930 and 1200 levels. The west crosscut from the north drift from the east crosscut near the sonth line, 930 level, is out 80 feet; face is in porphyry and clay.

Potosi.—The south drift, 35 feet west of the main shaft on the 850 level, is out 212 feet; face is in soft porphyry. The east drift, 73 feet above the 930 level, to connect with north raise from 930 level, is out 32 feet; face is in hard porphyry. The raise from the 8th floor, south stope, 1000 level, is np 21 feet; the top shows porphpry and quartz that gives fair assays. Extracted and sent to the mill the pest week 492 tons and 1250 pounds of ore from ths 550, 930, and 1150 levels. Milled during the week 530 tons. On hand at mill 123 tons and 250 pounds. Average battery assays, $24.72; average car-sample essays, $32.47. Shipped to the U. S. Miut, Carson, 885 pounds crude bullion.

Kentuck.—In the west ledge we ere stoping and saving about 18 tons of ore per day of milling quality.

Waed Shaft.—The west drift from ths station, 820 level, is out 32 feet from the shaft; face is in porphyry.

Bullion.—The west drift from the station, 820 level, Ward shaft, is out 32 fest from the shaft; face is in porphyry.

Exchequee.—The west drift from the stetion, 820 level, Ward shaft, is out 32 feet; face is in porphyry.

Alpha.—The west drift from the station, 820 level, Ward shaft, is out 32 feet from the shaft; fece is in porphyry.

White Pine District.

Oee Shipments.—The Eureka & Palisade Railroad received for transportation to Salt Leke City end Vellejo Junction, dnring July, 94 tons of ore as follows: Zoanni Bros., 40 tons; C. A. Mathewson, 28 tons; Rocco Kregnezo, 12 tons; and Ross & Siri, 14 tons.

White Horse District.

Neens Development.—The *Dispatch* says: White Horse only needs development. The Willey-Poole cleim has done its assessment work. John Hayes is working toward the Bald Eagle, and now he will not bond or sell to anybody. Dave Washeim and E. Z. Bsiley have very fair prospects in the Tiger. They are down 20 feet and still going. Four Spaniards from San Jose will start to work the Adeleide thie week, and are under contract to sink 100 feet and crosscut the same distance. Ex-Mayor Gregory of Sacramento was in town this week taking a look at the White Horse mines. He is pleased and will retnrn and do some business that way. On the Donelin-Toft claim the tunnel ie in 25 feet, and the quartz ledge is visible for 150 yards. The prospects are fine, and quantity, not quality, is desired, for the latter is assured. Mr. Schennert returned from White Horse on Monday night and went to Sacrameuto the seme evening. He has arranged the preliminaries by hiring several men to put the Jim Blaine mine in proper shepe for einking by etraightening np and timbering the shaft.

Eureka District.

Oee Shipments.—Enreka *Sentinel*, Ang. 5: The ore shipmente for July were light, es might have been expected, as the big drop in the silver market has resulted in the Diamond Company laying off their men, and general discouragement among the minere of the camp has caused a number of tribnters in other mines to qnit work and wait until something tnrns up or silver takes a raise. The Diamond people have concluded to ship no more ore under the present quotations for silver. The product they shipped lest month was broken down before the sudden drop occurred, and it is clear that it was better to convert it into bullion to be sold at the best advantage than to have it rotting the ore bins. The Eureka & Palisade Railroad Company received for transportetion to Selt Leke City and Vallejo Junction, during the month of Jnly, 346 tons of ore as follows: From Eureka district—Diamond mine, 271 tons; Richmond mine, 12 tons; Williamsbnrg mine, 16 tons; McGarry, snndries, 29 tons; and Lord Byron mine, 18 tons. Total Eureke district, 346 tons.

ARIZONA.

Goln Strike.—Mohave *Miner*: One of the biggest gold strikes made in Mohave county since the Gold Bug mine wae discovered has just come to light in Layne Springs. The Clack Bros. and Joe Pomher were doing a little work on what is known as the west extension of the Nighthawk, and when down ebout three feet from the snrface they uncovered a good-sized body of the richest kind of ore. The formation ie porphyry and tbe vein a contact. The gold in the ore is coarse and heavy and ehows np beautifnlly to the naked eye. Samplee of ore from the ledge were assayed and gave a rich retnrn.

BRITISH COLUMBIA.

The Bobbie Buens.—*Golden Era*, Jnly 29: Mr. John E. Askwith, who has for such a long time been known es the owner of the Bobbie Bnrns gold mine, McMnrdo hasin, East Kootenay, has returned this week from the coest, where he has snceeeded in forming a syndicate, composed of some of the leading mining men in Victoria, with a capital of $300,000. The nsnal legal formalities have to he gone through, after which active operatione will take place on the mill which is now in position on the mine.

OREGON.

Progeess at Ashland.—*Tidings*, Aug. 4: The new 600-foot tnnnel at the Ashlaud mine is still going through the tonghest kind of rock, but it moves abead at the rate of five feet a day with the aid of the Burleigh drill. . . Work at the Stonewall mine is progressing well. A tunnel is being driven in along the ledge to strike the deep prospect ehaft at a 150-foot level. It will be 360 feet long and is 170 now. A railway was laid this week in the tunnel to facilitate the work. Some fine pay ore has been taken out during the past week. . . Jas. E. Smith, who was in town thie week from the Pierson mine on the Klamath river, saye they expect to have their quartz-mill running within 30 days. It is the Jacobs mill of five stamps, which had beeu run as a custom mill near Henley. It has been moved and is being put up at its new site, where power to run it will bs furnished by a current-whesl in the Klamath river.

IDAHO.

Wabdner Deseeted.—Foothill (Cal.) *Tidings*, Aug. 3: The town of Wardner, Idaho, one of the principel mining towns of the Northwest, is practically deserted. Angus McKay, who arrived from there last evening, accompanied hy his wife, states thet on account of the low prics of silver all the mines have closed down and there is very little work of any sort of any one. Business houses are closed end the shutters nailed up, and owners of residences are willing to let them free of rentel to any one who will occupy them. "Ws bave," seid Mr. McKay, "one of the lergest ore bodies in the world, and if there is any legislation whatever in behalf of silver the mines will be reopened, but at its present low value the mining of silver ie very unprofitable, as it is regarded merely as a commodity instead of a precious metal."

NEW MEXICO.

Woek at Cook's Peak.—*Southwest Sentinel*, Anguet 1: There is little work now being done et Cook's Peak hut there ere very few men employed there. Shipmente of ore will not he worth mentioning until there is some improvement in the price of both silver and lead.

The Westeen Belle.—William Walker has leesed the Western Belle, also known es the Pattersou mine, at Gold Hill, and the Standard mill at that place. This is believed to be one of the best mines in the district and es promising es any in this section.

At Silver Ceeek.—With the exception of closing down of operations on the Confidence property at Silver Creek there is little change in the situation there. The outpnt of the camp remains about the eame and work on other properties continnes withont interruption. It is hoped that operations on the Confidence mill will be resnmed in the near future.

The Alhambea.—The Alhambra mine, at Black Hawk, is now reported to be in better shape than it has ever been before. Rich ore is in eight in the ehaft and in one of the drifts there is quite a body of high-grede ore. There has been a great deal of development work done in the mine dnring the past two years and in that time there has been considerable high-grade ore taken ont of the mine.

Watee foe Pinoe Altos.—*Southwest Sentinel*, August 1: It is reported thet the Manhattan Gold Mining and Milliug Compeny and the Pacific Gold Company have decided to pipe water to the mines at Pinoe Altos from a point above Fort Bayard, but nothing definite cen be ascertained in regerd to it. The mills could be operated at Pinos Altos as cheap as they can be operated here and all of the expense of transporting the ore would be saved. This amounte to $1.60 per ton, end as the mille eech bave a capacity of more than 50 tons of ore daily, the saving wonld be more than $160 a day. At this rate it would not take long to pay the entire cost of installing the water plant and removing the mills. It is hoped that the Montana tnnnel, which is now being driven by the Manhattan Gold Mining and Milling Company at Pinoe Altos, will be finished this month. It is being driven at about the rate of a foot a day and the manager thinks that it cannot be more than 30 feet from the end of the tnnnel to tbe vein. There has been no increase in the flow of water from the tunnel for some time.

WASHINGTON.

New Placee Mine.—A Tacoma special, Aug. 6, says: Miners Roper and Boys, of thie city, retnrned to-day and report a rich and newly-discovered plecer gold mine one mile from the mouth of the Americen river and about 40 miles from Ellensbnrg. Bill Tibb took a party of two Tacomans and one Seattleite into the district a short time ago. Roper and Boys say in one day one member of that party penned out nearly an onnce of gold, valued at $19. They brought a sample here which contains over 40 good-sized colors to about half a teaspoonful of black sand. Roper and Boys will retnrn as eoon as they get some supplies. They predict that there will be 200 or 300 miners in that country inside of a month. Roper and Boye filed on claims and posted notices, as those who had preceded them. Bill Tibb has been made cook for the camp, they sey, and besides doing the cooking pans out $2 to $3 worth of gold daily.

Quaetz Discoveey.—Toledo speciel, Aug. 4: Considerable excitement prevails here regarding the specimens of gold-bearing quartz brongbt from Green River mining district, in southern Lewis conuty. A prospecting party came in this evening and reports hundreds of men, some doing development on prospect holes, some tramping through the wooded foothills in search of gold-bearing quartz, which they would not know if they saw it, and others returning from the Green River district, eome of whom have discovered what promise to he valnable leeds.

Placees on Uppee Columbia.—Kettle Falle *Pioneer*: For over 100 miles south of the British line exist, at intervals of every few miles, deposits of gravel forming the river banks. These bars are generally quite large, containing all the way from 100 to 500 acres, and will average from 20 to 100 feet above high-water mark. These bars in the lest year have all been located and well prospected, the results being far greeter than was ever supposed to exist in large river banks. Hundreds of tests have been made in varions ways, from the gold-pan to the fine gold-saving machine, and the most reckless of tests with the gold-pan, where at leest a portion of the fine gold is sure to be lost, has given returns never less then 50 cents per yard, while the tests by both machine end fire run from $2.60 to $4.95 per yard.

Market Reports.

The Markets.

SAN FRANCISCO, Aug. 10, 1893.

Silver has taken a decided turn for the better during the week, the improvement being notable both at London and at New York.

One feature in connection with the reception of the President's message Tuesday in New York was the increase in the price of silver, which was quoted after the message was published at 74 bid and offered at 75¼. Brokers recalled the fact that on June 30th, when President Cleveland issued the call for an extra session of Congress silver sold at 67 to 69 bid and asked, but soon that market was exceedingly dull, almost as dull as before the receipt of the message.

Sub-Treasury Report.

J. P. Jackson, Assistant United States Treasurer at San Francisco, reports cash on hand July 31, 1893, as follows:

United States notes	$90,444 00
Treasury notes, 1890	21,025 00
National Bank notes	11,645 00
Gold certificates	6,320 00
Silver certificates	293,175 00
Gold coin	22,175,795 50
Standard silver dollars	24,194,237 00
Subsidiary silver coin	3,608,300 90
Minor coin	19 210 33
Total	$50,420,152 73

Quicksilver Trade.

The receipts of quicksilver at this port have been as follows:

Months.	1893.	1892.
January	2,243	1,701
February	2,388	1,543
March	1,588	1,875
April	1,623	1,901
May	2,511	1,598
June	2,790	1,614
July	2,014	1,632
Seven months	15,157	11,864

Against 7866 for the first seven months of 1891; 7013 in 1890; and 9487 in 1889.

The exports of quicksilver from San Francisco by sea in July, 1893, were as follows:

To—	Flasks.	Value.
Mexico	169	$ 7,079
Australia	50	2,075
Central America	112	4,604
New York	750	30,000
Totals	1,081	$ 43,758
January	3,208	129,360
February	1,235	49,579
March	1,859	74,269
April	1,073	45,084
May	646	28,345
June	1,228	51,357
Seven months	10,330	$421,752
Same time in 1892	5,546	230,372
Increase, 1893	4,784	$191,380

The total for the first seven months of 1891 was 2469 flasks, valued at $109,711.

The exports in the past seven months were distributed as follows: 6450 flasks to New York; 2603 to Mexico; 650 to Australia; 274 to Central America; 67 to New Zealand; 6 to British Columbia; and 280 to Prescott, Ont.

For some the Rothschild's price in London was £6 17s 6d per bottle (flask), and the local prices for home consumption were held at $43@43.50, as to quantity. On July 21st there were offerings from second hands in London at £6 12s 5d, and down to £6 9s on the 31st. On August 1st the Rothschilds came down to £6 5s, and to meet this cut the local market was lowered to $40@40.50, or a reduction of $3 per flask on previous quotations.

San Francisco Metal and Coal Market.

ANTIMONY.			STEEL.		
Per lb	—	@ 14	English, lb	—	@ 18
BORAX.			Canton tool	—	@ 8½
Refined, in car lots	—	@ 7½	B'k Diam'd tool	8½	@ 16
Powdered, do	—	@ 7½	Pick & Hammer	6½	@ 10
Concentr'd, do	—	@ 6½	Machinery		@ 5
All grades jobbing at advance.			Toe Calk	—	@ 4½
COPPER.			TINPLATE.		
Bolt	22	@ —	B. V. steel grade		
Sheathing	22	@ —	14x20, spot	—	@ 5 87½
Ingot, jobbing	—	@ 14½	Charcoal, 14x20	—	@ 5 87½
Do, wholesale	—	@ 13½	Do roofing, 14x20	—	@ 5 87½
Fire Box Sheets	22	@ 24	Do, do, 20x28	—	@11 75
IRON.			PIG TIN.		
Bar, base	—	@ 3	Spot ℔ lb	—	@ 24
Norway, base	—	@ 4½			

PIG IRON.	Spot.		COAL.	SPOT FROM YARD—PER TON.
Eglinton ℔ ton	20 00	@—	Wellington	$8 00
Glengarnock	21 00	@—	Creta	7 50
Am. Soft, No. 1	22 00	@—	Nanaimo	6 50
Shotts No 1	22 00	@—	Cilman	8 00
Puget Sound	20 00	@—	Seattle	6 50
Clay Lane White	21 00	@—	Coos Bay	5 50
Langloan	22 50	@—	Cannel	8 50
Gartsherrie	22 50	@—	Egg, hard	12 00
Barrow	22 50	@—	Wallsend	7 25
Cargoffiest	23 00	@—	Scotch Splint	8 00
CHROME IRON ORE.			Brymbo	7 50
Per ton	10 00	@—	West Hartley	8 00
LEAD.			TO LOAD—PER TON.	
Pig	—	@ 4½	Australian	6 37@—
Bar	—	@ 5½	Liverpool Steam	6 50@—
Sheet	—	@ 7½	Scotch Splint	00@—
Pipe	—	@ 6½	Cardiff	5@—
SHOT.			Lehigh Lump	11 00@—
Drop, sizes *smaller* than B, ℔ bag of 25 lbs	$1 80		Cumberland	12 00@—
Do do, B and *larger* sizes ℔ bag of 25 lbs	2 00		Egg, hard	10 00@—
Buck, Balls and Chilled do, ℔ bag of 25 lbs	2 00		West Hartley	7 50@—
QUICKSILVER.			COKE.	
Home trade, pr. flask	42 50 @43 00		English, to load	$9 50@10 00
			Do, spot, in bulk	—@10 00
			Do, in sacks	—@11 50
			Cumberland	9 50@—

Silver and the Metals.

NEW YORK, Aug. 9.—Following are the closing prices for the week:

	Silver in— London.	N. Y.	Copper.	Lead.	Tin.
Thursday	33	71	9 90	3 3n	18 70
Friday	33¼	71¾	9 85	3 3n	18 65
Saturday	33½	72¼	9 85	3 3n	18 65
Monday	..	72¼	9 85	3 25	18 75
Tuesday	34	73½	9 7n	3 25	18 65
Wednesday	34½	75	9 85	3 25	18 45

Mining Share Market.

There has been some slight advance in Comstock prices this week and the market has been stronger and more active than for sometime past. The proposed curtailment of expenses at the mines may have something to do with streogthening the market, for it is thought that if the mines were managed less extravagantly they could pay their own way and assessments would be fewer. Messrs. Zadig & Edwards returned from Virginia City on Wednesday and report that the project to reduce expenses along the lode is meeting with considerable encouragement. Already has the water company made a reduction in its charges, the railroad company has promised to reduce its rates and the Miners' Union is understood to be considering the matter of compromising on $3.50 per day. The plan to close down either the Savage or Norcross shaft has not been definitely settled as yet, and the Virginia *Chronicle* has the following in relation to the matter:

"Charles H. Fish and Herman Zadig, directors of the Savage Mining Company, and John W. Twiggs and Colonel William Edwards, directors of the Hale & Norcross, arrived Saturday night from San Francisco. The object of their visit to the Comstock is to ascertain whether it is advisable to shut down either the Savage or the Hale & Norcross shaft and to work both mines, which are adjoining, through one of these outlets. The gentlemen, since their arrival, have visited the underground workings of both mines, but no conclusion has yet been arrived at in regard to the matter. Repairs to the Hale & Norcross shaft have been completed and eight of the men heretofore employed in repairing the shaft and two from the underground force have been laid off. There are still a few left."

The Eureka Consolidated Drift Mining Company has made application to be listed at the San Francisco Stock and Exchange Board, and sent along its check for $100 lor the annual dues. This is the second gold-mining company to avail itself of the hoard. Some others are said to be considering the proposition. The South Idaho Mining Company, of Grass Valley, has also made application for listing its stock at the San Francisco Stock and Exchange Board.

The Dayton *Times* says seven more men were laid off in Sutro tunnel on the first of the month. This leaves only five men at work now in the tunnel.

The Morgan mill at Empire is running on Cal. Va. ore, and the Mexican will start up soon.

The Comstock pay-roll for the montb of July amounted to $78,252.76, which is $18,508 less tban was paid out for the month of June.

The following mining companies report having bad balances on hand August 1, 1893, with the July expenses at the mines unpaid: Andes, $10,-128.41; Alpha Con., $6458.02; Alta, $14,035.73; Best & Belcher, $12,567.03; Bullion, $17,517; Bodie, $6425.31; Caledonia. $8607.27; Challenge Con., $1420.99; Con. New York, $3607.94; Crown Point, $2492.13; Con. Cal. & Va.. $45,278.95 in cash here and $16,828.81 in the hands of the superintendent at Virginia City; Con. Imperial, $1717.62; Crocker, $512.77; Exchequer, $960.61; Gnuld & Curry, $11,-345.71; Hale & Nurcnss, $3446.91; Independence, $41.55; Mexican, $2515.89; Mono, $5475.06; Navajo, $238.65; Nevada Queen, $30.42; Ophir, $1595.86; Peer, $126.76; Peerless, $1021.14; Savage, $11,-071.09; Seg. Belcher, $17.75; Silver Hill, $243.59; Standard Con., $26 771.20; Sierra Nevada, $6691.32; Scorpion, $1361.37; Union Con., $10,200.96; Utah Con., $597.10; Weldon, $280.49.

The following mining companies report having had an indebtedness August 1, 1893, with the July expenses unpaid: Belle Isle, $3693.14; Bulwer Con., $3530.81; Belcher, $11,692.19; Chollar, $2061.26; Confidence, $2370.06; Commonwealth, $26,946.83; Del Monte, $24,997.75; Grand Prize, $719.90; Kentuck Con., $8706.01; North Belle Isle, $8175.35; North Commonwealth, $453.61; Occidental Con., $3320.83; Overman, $886.21; Potosi, $34,077.87, with huilion to be received and an assessment being collected; Silver King, $7840.90.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

The following brief list by telegraph, lor August 8th, will appear more complete on receipt of mail advices:

California—Frank W. Swigart, Arroyo Grande, buckle; Byron Jackson, San Francisco, traction engine; Henry P. Holland, San Francisco, rotary engine; Murray H. Durst, Wheatland, magazine gun; Gustav H. Schultze, Berkeley, coin-controlling apparatus; Louis Hardt, Yuba City, plane; George E. Evans, San Francisco, amalgamator of precious metals; Leonard E. Clawson. San Francisco, chimney; James W. Atkinson, San Jose, incuhator and brooder; William Cameron, Milpitas, hydraulic pump; Orein Burns, San Francisco, hrake for bicycles; Luther H. Buchanan, Pasadena, electric arc lamp; Robert M. Wren and A. J. Oliver, Oakland, cloih-measuring machine; Wm. B. Pleas, San Francisco, dredging machine; Joseph N. and H. J. Harrison, San Francisco, electrode for firing explosives; William Forsyth, Fresno, paper box; Francis M. Speect, San Francisco, pipe machine for making spiral wire springs; Charles W. Tremain, Portland, stamp.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIO PREEE U. S. and Foreign Patent Agency, the following are worthy of special mention:

APPARATUE FOR REDUOINO BITUMINOUS ROCK. Edwin R. Thomason, S. F. No. 502,211. Dated July 25, 1893. The improvemente covered by this patent especially relate to an apparatne patented by the same inventor Feb. 28, 1893. The apparatue is of that class for redncing, to a plastic or softened condition, bituminone rock and other asphaltnm compounds, in which a rotating vessel ie employed and in which it ie enbjected to the necessary heat to reduce it. The improvements iuclude a novel, automatically and periodically operating feed hopper, a novel, antomatically operating receiving door for the reducing vessel and a gate or ebnter for cntting off communication between the reducing vessel and an underlying discharge chamber, thereby preventiug the entrance of cold air to the vessel when the discharge chamber is temporarily opened to withdraw the reduced material.

MECHANICAL CALCULATING DEVICE —David L. Albert, Fort Bragg, Mendocino Co. No. 502,217. Dated July 25, 1893. Tbis device for mechanically calcnlating ie especially adapted to figuring the contents of lumber or the wages of men for partial periode where they are paid by the month or other term. It may aleo be nsed for other pnrposee. With thie device it is possible to calcnlate the wages of a large nnmber of men working at different rates and for different nnmbere of daye with great accuracy. It ie also especially usefnl for lumber tallying where tbe lumber ie heiug loaded into or diecharged from a vessel or car aud in which varietiee of eizes of lnmber are being handled, and it ineures great accnracy in the tallying.

NIPPLE HOLDER.—Josepb Canney, Butte City, Mont. No. 502,224. Dated July 25, 1893. The inventiou relatee to the general class of screw-thread cutting appliances, aud particularly to the eub-class of holders for retaining the work being operated npon. The object of the invention ie to provide a simple and effective holder for close nipples upon which right and left tbreads are to be cnt.

AUTOMATIO WEIOHINO ANN RECORNINO SCALE. Walter F. Burne, S. F. No. 502,222. Dated July 25, 1893. Tbis ie a weigbing apparatne whicb is also adapted to record weights and to deliver one card containing the record and retain the other ae a check. The retained check is delivered into a locked receptacle, where it ie kept until removed by the proper officer.

PLANT OR TREE PROTECTOR.—B. F. Gilman, S. F. No. 502,559. Dated Aug. 1, 1893. Thie consiste of a pecnliar cylindrical casing adapted to surrond a yonng plant or tree. It is made of the pithy reed known as the tnle, the reeds being stitched together in eheets and then being brought into a circle. The interstiece between the reede allow a free circnlation of air abont the plant, but it is protected from the snn and cold winds.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, August 10, 1893.

9:30 A. M. SESSION.

100 Belcher	30c	200 H & N	55c
500 Caledonia	5c	500 Mexican	40c
1700 Chollar	30c	200 Potosi	40c
150 Con. Cal. & Va	1.35	750 Savage	40c
100 Eureka D	45c	50 Sierra Nevada	40c
100 Gould & Curry	35c	500 Yellow Jacket	45c

2:30 P. M. SESSION.

200 Bodie	5c	50 Hale & Norcross	50c
200 Con. Cal. & Va	1.35	150 Overman	10c
200	1.40	200 Potosi	40c
100 Crown Point	35c	100 Sierra Nevada	40c
300 Eureka Drift	45c	100 Yellow Jacket	50c
100 G & C	35c	300	45c

Pacific Stock Exchange.

9 AND 10:15 A. M. SESSIONS.

100 Belcher	28c	300 O C & V	1.30
100	29c	150	1.35
100	30c	100 G & C	32c
100 Best & Belcher	58c	100	33c
500	60c	200 H & N	55c
500	62c	250 Mexican	40c
1000 Bullion	20c	500	37½c
200 Chollar	30c	300 Ophir	71c
100	26c	100	72c
100	27c	100	73c
100 Crown Point	32c	400	75c

2 P. M. SESSION.

300 Chollar	31c	300 S Nev	40c
300 C. C. & Va	1.35	150	38c
	1.30	300 Savage	43c
650 Crown Point	33c	200 Y Jacket	48c
100 G & C	37½c	100	47c
100 Ophir	76c		

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F JOURNALS.

ASSESSMENTS.

COMPANY AND LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T AND SALE.	SECRETARY.
Alhambra M Co, Nev	17	25c	July 14,	Aug 18, Sept 11	F S Schwarze, 324 Washington
Alpha M Co, Nev	50	25c	July 31,	Sept 4, Sept 25	E B Holmes, 309 Montgomery
Alta M Co, Nev	43	15c	April 25,	Aug 21, Sept 8	L Osborn, 309 Montgomery
American and Mexican M Co	10	2c	June 28,	July 31, Aug 19	F M Husted, 522 Montgomery
Belcher M Co, Nev	45	25c	July 31,	Sept 4, Sept 25	C L Perkins, Mills Bldg
Bodie Cons M Co, Cal	16	15c	July 24,	Aug 28, Sept 25	M E Willis, 309 Montgomery
Bulwer M Co, Cal	8	10c	July 20,	Aug 31, Sept 22	L Osborn, 309 Montgomery
Carmelo Land and Coal Co, Cal	6	8½	July 21,	Sept 1, Sept 20	R McBoble, Mills Bldg
Chollar M Co, Nev	35	10c	July 31,	Sept 5, Sept 26	C E Elliott, 309 Montgomery
Confidence S M Co, Nevada	23	25c	Aug 7,	Sept 11, Oct 2	A S Groth, 414 California
Eclipse M Co	5	2c	July 27,	Sept 4, Sept 25	O Tum Suden, 216 Bush
Exchequer M Co, Nevada	36	10c	June 29,	Aug 31, Sept 21	C E Elliot, 309 Montgomery
Gold Mountain M Co, Cal	5	8½	July 13,	Aug 16, Sept 4	J F D Curtis, 325 Montgomery
Gray Eagle M Co, California	33	—	July 10,	Aug 10, Sept 14	C C Harvey, 309 Montgomery
Illuie & Norcross S M Co, Nevada	104	50c	June 21,	July 27, Aug 18	A B Thompson, 309 Montgomery
Kentuck Cons M Co, Nev	6	10	July 11,	Aug 15, Sept 5	A Waterman, 309 Montgomery
Lady Washington M Co, Nev	9	10c	April 18,	Aug 9, Aug 30	L Osborn, 309 Montgomery
Mexican M Co, Nev	48	25c	July 17,	Aug 22, Sept 12	C E Elliott, 309 Montgomery
Occidental Con M Co, Nevada	13	10c	June 22,	Aug 16, Sept 6	A K Durbrow, 309 Montgomery
Ophir M Co, Nev	60	25c	July 31,	Sept 4, Sept 25	E B Holmes, 309 Montgomery
Potosi M Co, Nevada	33	25c	July 11,	Aug 15, Sept 5	C E Elliott, 309 Montgomery
Savage M Co, Nevada	81	25c	June 29,	July 28, Aug 14	E B Holmes, 309 Montgomery
Seg Belcher and Mides Con M Co, Nev	12	10c	July 28,	Aug 23, Sept 18	E B Holmes, 309 Montgomery
Sierra Nevada S M Co, Nevada	105	20c	Aug 2,	Sept 8, Sept 25	E L Parker, 309 Montgomery
Ventura Asphalt Co, Cal	1	50c	July 11,	Aug 26, Sept 18	F. A. Brooks, Monty'y Block
Waterloo G M Co, Cal	1	15c	Aug 2,	Sept 6, Sept 25	J M Bailey, 18 Post
Yellow Jacket M Co, Nev	65	25c	July 29,	Sept 5, Oct 9	W H Blauvelt, Mills Bldg

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Alta S M Co, Nevada	Annual	L Osborn, 309 Montgomery	Aug 3
Arnold G & S M Co, California	Annual	A Judson, 320 Sansome	Sept 5
Colorado River Placer M Co, California	Annual	B M Bradford, 239 Montgomery	Aug 21
Derbec Blue Gravel Co, Cal	Annual	T Wetzel, 320 Sansome	Aug 16
Independence M Co, Nevada	Annual	J W Pew, 310 Pine	Aug 21
Martin White M Co, Nev	Annual	K L Ross, 120 Sutter	Aug 17
Omaha Cons M Co, California	Annual	C A Grow, Mills Building	Aug 18
South Feather Water & Union M Co, California	Annual	J Coffin, 122 Davis	Aug 14

DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE
Bulwer Cons M Co, California	5	L Osborn, 309 Montgomery	Oct 20
Champion M Co, California	10	T Wetzell, 310 Pine	May 15
Cons New York M Co, Nevada	10	C E Elliott, 309 Montgomery	Feb 15
Great Western Quicksilver M Co	25	A Halsey, 328 Montgomery	Oct 8
Mayflower Gravel M Co, California	10	D M Kent, 330 Pine	June 30
Pacific Coast Borax Co., California	1 00	A H Clough, 230 Montgomery	Jan 10
Standard Cons M Co., California	10	J W Pew, 310 Pine	July 25

Cal. Debris Commission Notices.

NOTICE.—The California Debris Commission, duly appointed under the Act of Congress of March 1, 1893, having received a petition of R. M. Moore and J. O. Boyd for permission to mine by the hydraulic process at the Kelly Hill Gold Gravel Mining property, situated in Butte County, in sections 27 and 28, Township 23, N., Range 3, East, and to deposit tailings in Neshit and Brewer Gulches, which discharge into Big Butte Creek, gives notice to all concerned that a hearing will be held at the office of the Commission, Room 92, Flood Building, San Francisco, on August 29, 1893, at 1:30, P. M. On and before this hour and day all parties interested may file affidavits, plans and maps, in support of their respective claims. By order of the Commission; W. H. Heuer, Major, Corps of Engineers, U. S. A., Secretary.

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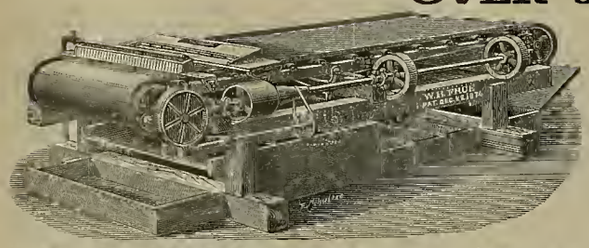

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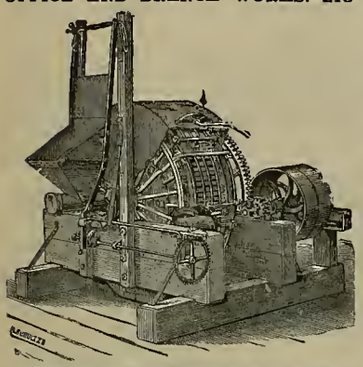

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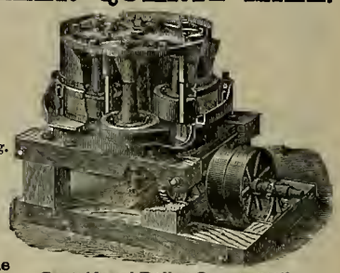

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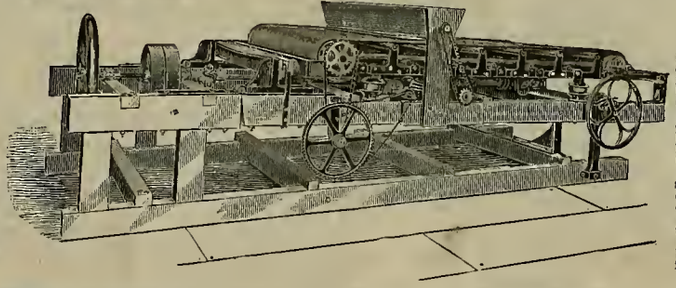

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SAN FRANCISCO, SATURDAY, AUGUST 19, 1893.

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A Hydraulic Mine.

The prospect of renewed operations in hydraulic mining in the State makes the accompanying illustration of special interest. It is typical of large numbers of mines in California, some active, others idle, and the picture is so complete that it is almost unnecessary to describe the process. Hydraulic mining is officially described in the California code as "mining by means of the application of water under pressure through a nozzle against a natural bank." In other words the gravel is washed down from the bank and the gold taken therefrom by process of sluicing. Cuts are made in the bedrock, and the gravel is washed through them, the gold being retained in the sluices, and the debris passing on to a dump in the river or canyon or other depository. Twenty-five hundred inches of water is used in the Nevada county mine shown in the illustration. The monitors are nine inches at the nozzle.

A CALIFORNIA HYDRAULIC MINE.

There is an ancient channel, called the "dead blue river," which extends from Downieville, in Sierra county, almost due south through the counties of Nevada, Placer and El Dorado, a distance of 60 miles. The gravel is blue in color, and is overlaid by volcanic matter. Upon this channel are located the richest drift and hydraulic mines of the State. Its elevation at Downieville is 5000 feet, and at Placerville 2800 feet above the sea, and may be traced through Eureka, Quaker Hill, Dutch Flat, Gold Run, Georgetown and Placerville. Mr. John H. Hammond, a mining engineer, estimates that this channel has yielded $3,000,000 for every mile of gravel. Mr. John S. Hittell estimates that $250,000,000 has been extracted.

The other channels are more or less broken up and are not continuously connected. One begins at the northeast part of Shasta county, and thence runs southwest through Shasta into Trinity and across Humboldt county, and ends at the ocean at Gold Bluff. In Siskiyou county, along and adjoining Klamath river and its tributaries, are over one hundred hydraulic claims.

The so-called dead Stanislaus channel runs for 20 miles parallel with the present Stanislaus river. Upon this channel is situated the famous Table Mountain. Other systems are found in Yuba, Plumas, Butte, Amador, Calaveras and Tuolumne counties. Scientific opinion is divided whether these channels are ancient rivers; the popular opinion is that they are. At any rate, they are well enough defined to warrant the expenditure of capital in their development. The elevations of the bedrock are so well known, and the geological structure of the country has been so well studied, that little risk is taken in exploiting them. The general theory of these auriferous channel deposits is that they lie on the bedrock of old, buried rivers, contain some gold throughout, but are by far the richest on the country rock at the bottom, and are covered from nothing up to 1500 feet deep with volcanic ashes, tufa, lava and mud from eruptive agencies active after the gold-bearing gravel deposits were formed.

THE quarters of the Mechanics' Institute library on Post street have become too small, and for some time the directors have been considering the advisability of putting up a new building. Recently a committee was appointed to report on this subject. This committee, consisting of George Cumming, Marsden Manson, George E. Dow, Oscar Lewis and A. W. Scott, is now considering the advisability of erecting a building on the Hayes-street side of the Mechanics' pavilion, on the site now occupied by several frame structures. The strip of ground is 75 feet by 412, extending along Hayes street from Polk to Larkin. On this strip of ground the committee proposes to erect a four or five-story building, the top floors to be designed for the reception of the library and for necessary offices and lecture halls. The ground floor is to be cut up into stores and the floors above not occupied by the institute are to be devoted to offices. E. R. Swain has been employed as advisory architect, and he has already made several sketches for the consideration of the committee. Nothing has yet been decided upon, however.

THE VEXED QUESTION of wages has been settled at the Nanaimo and New Wellington, B. C., coal mines by a reduction of twenty per cent at the former and ten per cent at the latter. The reduction is for three months. The miners have averaged daily from $2.50 to $5.50 besides getting coal for use free.

A Promising District.

J. V. Keeley, formerly of Pioche, Nev., is in San Francisco in the interest of mines in Yellow Pine district, Lincoln county, Nevada. If the old Nevada theory still holds good that a mining camp is no account unless it is hard to get at, then Yellow Pine is possessed of claims to distinction, for it is very difficult of access. At present the nearest way is by rail from San Francisco to Blake's station on the A. & P. road, in San Bernardino county, thence to Vanderbilt 35 miles, and northeast 55 miles further to Yellow Pine.

The Nevada Southern railroad, a Denver corporation, is building through the district and extending northward. Mr. Keeley finds Colorado men more disposed to develop that country than are residents of San Francisco. So far, Denver capital has been solely invested to the exclusion of San Francisco capitalists, though every dictate of business suggests that to this city the output should come.

The country rock is mostly lime, badly broken up and bidding defiance to the theories of formationists, porphyry dikes intervening in every direction. The ore, chiefly red oxide, from the Keystone, Olementina and other mines, averages an assay of $325 in gold. The former mine has shipped seventy tons to Denver with very satisfactory results. On this trip Mr Keeley brought fifty tons to San Francisco at an expense of $80 per ton. The returns were fully up to the average.

So far nothing but free milling ore has been touched, but the whole country is full of base ore enough to run half a dozen smelters for an indefinite period.

The climate is something awful. Nothing but sharp, shining sand and brilliant sunshine, the thermometer ranging from 90 degrees to 120, water four cents a gallon and everything to eat, drink or use packed fifty miles through sand hub deep, make an undesirable combination.

But the gold is there, and lots of it, and with due encouragement on the part of capital Yellow Pine district will bring back to Lincoln county the old-time prestige of the days when the Ely district was pouring hundreds of thousands of dollars monthly dividends into this city.

RICH DEPOSITS OF ASPHALTUM are said to have been discovered on the Uintah reservation in Utah. A syndicate, headed by Adolph Busch, the St. Louis brewer, has been organized to get possession of the asphaltum deposits. It is necessary first to open the reservation to settlement.

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An Era of Retrenchment.

It was once said by a prominent resident of Nevada that he didn't care what happened so it didn't happen to him. Several in Nevada and California are now saying the same thing regarding the proposed reduction of wages on the Comstock. All see that retrenchment is necessary, but whether it shall be manifested mostly in cutting down miners' wages or official salaries is the point at issue. Custom, tradition and precedent have had a good deal to do with the matter. It is not so very many years ago that, addressing a crowd of excited miners from the balcony of the International hotel in Virginia, Nevada, Wm. Sharon assured his auditors that he didn't propose to aid in the efforts then being made to reduce the wages to three dollars a day. "Why," said he, "it's all the same whether I pay you four dollars a day, or six dollars. I'll get it all back anyhow."

Those were the days when the men who worked in the breast of the drift were the heaviest outside buyers of stock, and who were depended on to give tips to friends on the outside when to come in and when to stay out. What Sharon said was then half joke and whole earnest; he and his confreres did get back considerable of what was paid in a good many ways, but the time has gone by when the men who carry their dinner-pails bought stock and sat in to the old game of freeze-out assessments.

Times change, and people now on earth must change with them. So far as the assessment business is concerned, it is inevitable that must change, too, for even a holder of Comstock shares will in time tire of carrying his cherished holdings.

With considerable strength of argument, the men employed on the Comstock point to the salary list and claim that among the officials is the place to cut down. They cite the Andes mine, which last June had two miners employed. During June the Andes paid a superintendent $300, an assistant-secretary $100, a secretary $250, a president $250, rent of office $100. This does look somewhat top-heavy, and the fact that such anomaly exists gives great reason to the claim of the men who do the manual labor, that in the offices is the place to begin the necessary work of retrenchment. During that one month of June the expense account of the Comstock aggregated $195,000. Less than twenty-five per cent of this—$44,000—was paid to men engaged in the actual work of mining. The other seventy-five per cent went for other expenses. It cost for the month $5800 to superintend the mines, $6230 for secretaries and assistant secretaries, $4650 for presidential services, and so on.

This is an era of retrenchment, and while the laborer is worthy of his hire, all concerned must bear in mind that the business won't stand the present prices paid employes in every department of work on the Comstock and elsewhere.

Hydraulicking Under the Law.

It is probable that the first hydraulic mine to be operated under the Caminetti law will be the Kelly Hill Gold Gravel Mining property in Butte county, at Big Butte creek, about seventeen miles from Chico. Mention of the application of Messrs. J. C. Boyd and R. M. Mooer, the owners, was made last week. The deposit is very rich and is so located that tailings may be deposited in either of two gulches. Restraining works will probably never be needed, but, if they are, there are ample facilities for their erection. Some drift work and ground sluicing have already been done, and something like $170,000 taken from the gravel, which has so far averaged $3.50 to the cubic yard. Five hundred inches of water are to be used, and it will be obtained from the Cherokee Mining Company. Two giants will be put in. The fall of the water is about 1100 feet, its present distance about 3½ miles. Messrs. Mooer and Boyd are sure they will get considerable gold from the gravel, and they do not complain particularly of the hardship of the Caminetti law, or of the three per cent required to be paid to the Government, although, as a matter of fact, their location is such that their mine could have been operated without interference at any time in the past. But they prefer to settle all legal questions now and go on without possibility of interruption in the future.

The example of these gentlemen might well be emulated by many others. It is true that times are hard and the law is not satisfactory. But a half-loaf is better than no bread. The chance of securing more favorable enactment is not first-class, and effort in that direction is, we think, not now contemplated. Some hydraulic miners say they prefer to leave their gravel beds wholly untouched rather than to exhaust the deposits, dissipate one-half of their profits (more or less) in construction of restraining works, in paying the Government's three per cent, and other expenses made necessary by present legal requirements. Their view is believed to be erroneous and likely to injure their own interests. A mine paying $1000 per month for a series of years is not as desirable a property as a mine paying $2000 for the same period, but it is $12,000 per year better than nothing and $12,000 more lucrative than an idle mine is, or, in our judgment, will be, if the owner awaits the time when the anti-debris influences are all dead and the industry is completely unshackled. Hydraulic mining in California has for a number of years been under a very dark cloud, but the sky is clearing and an avenue is opened up for renewal of operations under circumstances that will allow a modified degree of its former vigor and importance.

Congress and Silver.

Congress has addressed itself in earnest to the task of remodeling the coinage laws, and measures designed to relieve the prevailing financial disorder have been presented in large number. The main silver question has so far occupied the exclusive attention of the House, but the Senate is considering collateral matters, such as the national banking laws, the increase of currency, etc, etc. Its policy is to wait until the House has disposed of the Sherman law, and then continue the discussion begun by the lower body.

Whatever may have been the situation at the beginning of the special session, it is unquestionable that the silver men have gained both strength and confidence since the delivery of the President's message, declaring oracularly for a gold standard, offering no sort of compromise to silver men or bimetallists and suggesting or promising nothing beyond the unconditional repeal of the Sherman law. The President's message was a serious mistake. It has done much damage to his own cause. It was too clearly the embodiment of the puritan sentiment which has attempted and has partly succeeded in making silver the scapegoat of all the financial evils under which the United States is now laboring. Further, the universal encomiums the message has received in England and in the extreme East have not had the effect of strengthening the President's hands. The silver men in the House continue to be the aggressive element in debate, and are making a hard and determined fight.

The general opinion is that the Wilson bill for unconditional repeal will pass the House and that it will be defeated in the Senate. If, however, the administration is strong enough to force the bill through the upper body, Mr. Cleveland will quickly sign it and be in position to dictate subsequent legislation. When the bill passes the House, the policy of the silver men in the Senate will be to load it down with amendments, and their plan of campaign has a good chance of success. The amended bill, when through the Senate, will be returned to the House, where the fight will be on again. If a compromise is reached and sent to the President, it will likely encounter his veto. The whole question seems likely to resolve itself into a situation with the Senate on one side and the House and President on the other. There may be a deadlock. Everything depends on the Senate.

The silver men have no reason to despair. The President has inadvertently handed to them the cool end of the poker.

Shows His Faith by His Works.

Ex-State Senator Cross of Nevada county, one of the framers of the Caminetti bill, will demonstrate his faith in the practicability of the measure by operating a hydraulic mine at Brandy City, Sierra county. The mine had been shut down, having been enjoined from work, but now the Senator proposes to have surveys made, to the end that he may apply to the Debris Commission for license to mine. Mr. Cross thinks two-thirds of the hydraulic mines of the State may be worked under the law, after proper restraining works have been erected. He adds:

"The dams will cost considerable money and will consume a large amount of the profits of the mine, but in the end the country will be benefited, for the money that otherwise would have gone into the pockets of the miners will be paid out for material and labor. The Caminetti bill, I firmly believe, will result in a solution of the hydraulic-mining question.

"I venture to say," continues Mr. Cross, "that had the hydraulic miners been allowed to operate the past ten years, the United States wouldn't be disturbed as it is and that the silver question wouldn't present the phase it does now, for in the past ten years the mines would have produced $100,000,000 of gold. I estimate that for every dollar of this gold three dollars of silver would have been spent. The production of this vast amount of gold would have necessitated the coinage of plenty of silver, and the result all around would have made the financial condition of this country very much healthier than now, and, in addition, the circulation of money would have been freer."

Although the ex-Senator's views on the financial phase of the matter are, from the nature of things, merely suppositious, there can be no question that the volume of wealth of the country has been much restricted by the idleness of the hydraulic mines. But the mines are still there and most of them can be worked. Capital for repair and operation will be easier to secure after awhile than it is now. It seems certain that hydraulic mining in California will after awhile assume something like its old-time dimensions. The time to begin is now, wherever practicable. Gold is worth more than it ever was, for its purchasing power is greater than at any time in history.

Mr. Cross thinks the farmers will stand by the Caminetti law. As a class they doubtless will. But there are some professional grangers who will never allow themselves to learn that the hydraulic war has ended as long as they have a unit of lung power left.

A CORRESPONDENT of the Marysville *Appeal* preaches to the anti-debris people the necessity of keeping strapped down the "hydraulic giant," the creature of "non-resident and foreign corporations." Gulliver has awakened and he is breaking the threads of the Lilliputians. Though it is distinctly assured that the interests of the farmers along the Sacramento, Yuba, Feather and other rivers are to be protected, the Anti-Debris Association continues to howl just from pure habit of howling. It will not close its mouth long enough to allow itself to hear of the equities, necessities and honest intentions of the hydraulic miners. It considers the effort to resume mining an "unholy crusade," but it is not able to point out satisfactorily in what respect mining under the law is damaging or mischievous. The association knows, or it ought to know, that it has the right to appear before the Debris Commission and protest against the grant of every application for license under the Caminetti law. It knows, or it ought to know, that the law expressly provides for the rejection of every application wherein the interests of adverse parties are at all likely to suffer. The applicant must affirmatively show that his location is such that no damage will result to other properties. The way of the anti-debris people is clear, easy, effective and inexpensive. It does not come with good grace for an association representing much the smaller fraction of the total interests involved to declare that under no circumstances shall the greater be allowed to escape from the complete control of the less.

THE CELEBRATED Last Chance-Tyler mining case has reached the Federal Court of Appeals in this city, having been brought from Idaho. The Tyler mine in Shoshone county has one of the richest silver ledges in the State. The dip is 40 degrees. Several mining claims were located adjoining the Tyler mine, with the idea of tapping the ledge. The Last Chance mine succeeded in effecting its purpose, extracting, it is alleged, $200,000 worth of ore. Suit was brought by the Tyler people. Judge Beatty gave judgment in that amount to the Tyler mine in the United States Circuit Court for the Idaho district on March 6, 1893. The case was then carried to the United States Court of Appeals, in which it is now being considered.

Important Decision in a Mining Case.

An interesting and important decision has just been rendered by Judge Davis of the Superior Court of Amador county, in the case of the Keystone Consolidated Mining Company vs. the South Spring Hill Mining Company. The Keystone company alleges in its complaint that the South Spring Hill company is working on its ground beneath the surface, and asks for an injunction, damages and an order that it be allowed to inspect the defendant's mine so as to ascertain the amount of damage done.

In granting the order allowing survey and inspection of the underground workings of the South Spring Hill mine, Judge Davis reviews at length the English chancery cases hearing upon the question and the few American cases. The following is an extract from the decision:

"Ought a court of equity, in a mining case, when it has been convinced of the importance thereof, for the purposes of the trial, to compel an inspection and survey of the works of the parties and admittance thereto by means of the appliances in use at the mine? All the analogies of equity jurisprudence favor the affirmative of this proposition. The very great powers with which a court of chancery is clothed were given it to enable it to carry out the administration of nicer and more perfect justice than is attainable in a court of law.

"That a court of equity, having jurisdiction of the subject-matter of the action, has the power to enforce an order of this kind will not be denied. And the propriety of exercising that power would seem to be clear, indeed, in a case where without it the trial would be a silly farce. Take, as an illustration, the case at bar. It is notorious that the facts by which this controversy must be determined cannot be discovered except by inspection of the works in the possession of the defendant, accessible only by means of a deep shaft and machinery operated by it. It would be a denial of justice, and utterly subversive of the objects for which courts were created, for them to refuse to exert their power for the elucidation of the very truth—the issue between the parties. Can a court justly decide a cause without knowing the facts? And can it refuse to learn the facts? But one adjudication of this subject can be found in the books and this is in conformity with the views here expressed, viz., Bainbridge on Mines.

"Of course, before granting an order of this kind the court must be satisfied that the application is made in good faith, and in granting it will pay due regard to the convenience of the party affected."

The order for a survey was thereupon granted as prayed for in the petition; with, however, certain important limitations as to the amount of rock in each sample, the limits of the mine to be surveyed, the number of persons to be engaged and the time to be occupied in the survey, to the end that there might be no serious inconvenience or hardship upon the defendant corporation.

Mr. Hallidie at the Chicago Fair.

Mr. A. S. Hallidie, the well-known inventor and manufacturer of this city, has been making a visit to the World's Fair, and he furnishes to the *Bulletin* a very entertaining and instructive letter. He was in constant attendance at the great show for four weeks and he pursued his sight-seeing in so systematic a manner that he was able to "take in" all its important features. After having visited all the great modern expositions, at home and abroad, Mr. Hallidie unhesitatingly pronounces the Chicago fair the chief of all. Naturally, we might expect that the mechanical features of the great show would impress themselves particularly upon Mr. Hallidie, and we are not surprised to find him giving dimensions and distances. This is how he describes the immensity of the show:

"Of the 533 acres of ground occupied by the fair grounds proper, about 150 acres are under cover, one building—the Manufactures—alone covering 32 acres, or say a space equal to 11¾ blocks north of Market street, San Francisco, or 70½ 50-varas! The remaining 383 acres are laid out in excellent walks and drives, kept in good order and well-sprinkled, and with canals and basins, with pretty bridges, jetties and landings, the waters being enlivened with electric and steam launches and gondolas.

"The immensity of the exhibition is not at first realized, and it is only after walking from one building to another at the extremes of the grounds that one becomes aware of the great distances. For instance, from the Fisheries Building to the Agricultural Building Annex is over a mile; from the Government Building to the Administration Building is nearly three-fourths of a mile; from Fine Arts to Forestry is one mile and one-third."

The writer offers good advice about study of maps to familiarize oneself with the relative position of buildings and suggests a trip on the intramural (electric) road, which touches nearly all the main buildings. He continues:

"I took in the Manufactures and Liberal Arts Building first and did it rapidly. It occupied 3½ days of about 6 hours each. The longitudinal and transverse avenues on the main floor aggregate 6 miles and in the galleries 3¼ miles, or 9¼ miles in all. The small passages in and across the exhibits will probably aggregate 12 miles more. It will thus be seen that in 21 hours actual time about 21 miles was walked over, looking at and examining the articles on exhibition. In the Transportation building there are four miles of principal avenues on the main floor. The rapid inspection of this floor required two days, and so with the other buildings—Electricity, Machinery, Agriculture, Horticulture, Mining, etc. There are 13 principal buildings, including the Government Building, equal in number to the original States, while 41 States and 3 Territories and 17 foreign nations have buildings of their own on the grounds."

The trouble with the fair is that it is too big. There seldom appears to be a crowd. Exhibitors and commissioners are disappointed at the attendance, which is largely from towns within 200 or 300 miles of Chicago. Mr. Hallidie urges all who can possibly spare the time and money to see the fair and says:

"The facilities for getting from Chicago to the fair are excellent in every way—cable and electric cars, elevated and surface steam roads and steamboats carry all the passengers who offer. The Chicago City Cable Railway Co. collected nearly 500,000 fares on the Fourth of July, and on returning from the Auditorium on the evening of that day, on the elevated road, I met, in going from Congress street to Forty-eighth street, 20 trains, each train consisting of six cars, filled by 150 passengers each, or a total of 18,000. * * * * * *

"It is a pity with all this that the patronage is so small. It is not expected that such exhibitions will show a credit balance at the close. Of the finances of this great fair I gather from Auditor Ackerman's report to July, and from the admission from the opening to July 14th, the following results:

EXPENDITURES.

Construction expenditures	$16,229,905 74
Obligations under contracts	1,286,675 26
General and operating expenses	4,299,579 73
Preliminary organization	90,674 97
Accounts payable	710 553 46
Operating expenses from July 1st to October 26th	1,500,000 00
Interest on bonds, $4,444,500	444,450 00
Total expenditure to Oct. 26th	$24 561.839 16

RECEIPTS.

From city of Chicago	$5,000,000 00
From stockholders	5,589,067 60
From bonds	4,444,500 00
From souvenir coins	2,428,040 70
From interest	95,513 46
Miscellaneous items	437,027 57
Concessions to July 1st	580,006 36
Concessions to Oct. 26th, estimated	1,500,000 000
Gate receipts before May 1st	282,449 00
Estimated gate receipts during fair	7,900,000 00
Estimated salvage	500,000 00
Total receipts	$28,756,660 46
Total disbursements	24,561,839 16
Balance	$4,194,821 30

"Which will leave a deficit to pay bonds of $249,678.70 and prove a total loss to amounts advanced by the city of Chicago and the stockholders—$10,589,067.60 in addition. In the above calculation the average daily attendance is placed at 100,000 per day.

"This should not be, and it is unfortunate it is so. Instead of an average daily attendance of less than 80,000 up to this time, it was reasonable to expect, in view of the enormous outlay and efforts made to insure success, that the attendance would average certainly 150,000 daily, which would have made a difference of about $5,000,000 in the receipts for admissions and probably $1,000,000 in the receipts from concessions."

A WASHINGTON DISPATCH contains the information that Representative Caminetti has been trying to find out why an additional engineer is not appointed for the California Debris Commission, and he has learned that Assistant Secretary of War Grant does not look with favor upon the Commission nor the law under which it is working. It is interesting to learn from the dispatch that the assistant secretary wants to be convinced as to the merits of the law; but it would be a good deal more interesting to know why it is necessary to convince any officer of the wisdom of any statute before he can be prevailed upon to carry out its provisions. There is an old-fashioned notion in this part of the world that it is the duty of an executive officer to administer the law without inquiry as to its policy or efficiency, and to do it as speedily and thoroughly as practicable. But things occasionally happen that materially assist us to a contrary conclusion. The Mining Commission has a great deal of work to do, and it ought to be assisted in every reasonable manner by the authorities at Washington. The Caminetti law is by no means all the hydraulic miners wanted; but it seems to have been the very best they could get. Now, having manifested a disposition to accept its provisions, they have a right to expect that every facility will be afforded them. The Debris Commission is doing all it can, and will no doubt continue to work as rapidly as possible.

PEOPLE who have just returned from Kootenay say that the depression of silver materially tends to make silver-mining quiet. Development work is going ahead, but not to the extent that it would under other conditions.

Foundry Notes.

THE Germania Lead Works is adding to its plant two of the largest-sized Bruckner roasting cylinders. Each cylinder is 8½ feet diameter by 22 feet long, weighs 46,000 pounds, and has a capacity to each charge of about 12 tons. These cylinders were furnished by the Vulcan Iron Works of this city.

THE new triple screw cruiser Minneapolis was launched at the Cramps' shipyard, near Philadelphia, August 12th. She has the following dimensions: Length, 412 feet; beam, 58; draught, 24; displacement, 7475 tons. On the trial she must show a maximum speed of 22 knots and a continuous steaming speed of 21 knots.

THE cruiser Olympia is off the drydock and is being made ready for her trial trip, which takes place in about ten days. The engines and boilers are nearly ready for the preliminary tests. The eight-inch turrets are yet incomplete, awaiting the arrival of heavy steel tubes from the East. Two anchors, weighing 9000 pounds each, have arrived.

THE first consignment of armor plates for the monitor Monadnock has arrived at Mare Island Navy Yard from the Carnegie works. The consignment consists of six plates, three straight and three curved. Their aggregate weight is 41,000 pounds; the three larger ones weighing 11,000 pounds each. It is understood that there are several consignments in transit to the coast. These plates will be put in position as soon as possible and an effort will be made to hasten those en route.

THE Union Iron Works has completed the new steam-yacht El Primero for E. W. Hopkins. The official trial trip was made last Friday. She went over a two-mile course four times. The first time the screw was worked at 150 revolutions a minute, the second time at 200, the third time at 260, and the fourth and last time at 330. At that number she made a maximum speed of 16½ miles an hour, with an average of 15¾ miles an hour. This is three-quarters of a mile an hour faster than her contract calls for. The working of the engines when the yacht was pushed to 330 revolutions was something wonderful. There was no jarring, kicking or hitching, and not the least vibration.

Tailings.

THE W. Y. O. D. Mining Company, at Grass Valley, has declared a dividend of ten cents per share, making the fifteenth dividend thus far declared by the company. The mine is looking well, and there is every indication that more dividends will follow.

THE mines of the New Vancouver Coal Company at Nanaimo and New Wellington, British Columbia, employ the large number of 1480 men. Last year they produced something over 550,000 tons of coal, and in 20 days last June they produced 52,500 tons. A very large fleet of vessels is employed.

THE Pittsburg gold mine, near Battle Mountain, Nevada, has closed down, throwing about 30 men out of employment. The shutdown was caused by the scarcity of water, the mill being built on the mountain-side, where it is impossible to obtain enough water for milling purposes during the dry summer months.

THE stockholders of the Granite Hill Mining Company have elected the following directors: Willard Gardner, J. F Cooper, and Street Superintendent Green of Sacramento, and W. B. Van Orden and Wm. George of Grass Valley. The board organized by electing J. F. Cooper president and J. M. Wiley of Grass Valley secretary. S. B. Fowler was elected superintendent.

OPERATIONS in the Utah Consolidated at Virginia were suspended last week. Explorations in that mine have been in progress for the past 20 years, and during that time assessments have been levied on the property aggregating $420,000. Latterly only two men have been employed in underground work. The failure of the shareholders to pay the last assessment is the cause of the shutdown.

PROSPECTORS returning from the Hoodoo mines in the Coeur d'Alene mountains, 60 miles east of Colfax, Wash., bring a good deal of gold dust from the placers and a few nuggets. Experienced miners, who have been there, declare that before long the Hoodoo will be a fine producing camp. Several outfits from various parts of Palouse are preparing to go up on prospecting trips of a month or six weeks.

THE Morning Star mine of Iowa Hill is to the front again with another dividend, the amount being $2 per share, or $4800 in the aggregate. For the past two years the mine has averaged about $2 per share per month in dividends, making a total of about $120,000. At the present time extensive improvements are being made at the mine, which is good evidence that it is looking well and that more dividends may be looked for.

ARTICLES OF INCORPORATION have been filed in the office of the Secretary of State by the El Rey Mining Company of Sacramento. The capital stock is $1,000,000, being 100,000 shares of $10 each, and the amount already subscribed is $355,000. The directors are: C. J. McBride of Lincoln, and J. F. Fenton, M. J. Terry, S. Katzenstein and C. J. Atwater of Sacramento. The mine which the company intends to operate lies about eight miles from Auburn and fourteen miles from Shingle Springs.

THE McCrum Sampling and Milling Co. have started their machinery in Arizona at the old Silver Belt silver mine, four miles from the noted Bowers' ranch and the Agua Fria, 18 miles from Prescott and four miles from Big Bug. One hundred and fifty feet of trestle work connects the bins to the sampling room—an iron building 16x20 feet and 20 feet high. This contains the rock-breaker, Cornish rolls and the automatic sampler, the invention of the manager. The works have a Huntington mill of ten tons capacity, with power sufficient for two more of that size. They have two Frue vanners for concentrating, and will handle all kinds of ore. Also a 35-horse power engine with a 60-horse power boiler, and a 5x3x8 Hooker pump for use in case of fire. The works will use the Silver Belt mine as a reservoir for their water supply, its many drifts and stopes affording ample storage capacity.

Studies in Gold-Milling.

NUMBER II.

[Written for the MINING AND SCIENTIFIC PRESS by J. A. EDMAN.]

An examination of the products of amalgamation obtained in gold milling strongly impresses the observer with the evidence it presents of being mainly a chemical process or a combination in definite proportions between gold and quicksilver. Three varieties of amalgam have been noted by the writer, all referable in their crystallization to the Tsometric system, namely, the acicular, the prismatic and the octahedral amalgams, all to be found in most quartz-mills. The acicular amalgam appears as groups of slender and delicate, straight but tapering crystals, silver white and highly lustrous, and generally forms where the mercury is largely in excess, as in riffles, wells and traps, a low temperature as from 32° Fahr. to zero being most favorable to their development. At about 70° they become fluid and are generally very fragile. Deprived of their quicksilver by careful treatment with cold dilute nitric acid, they form beautiful objects for the microscope, their size ranging from 1-1000 to 1 inch in length. Percentage of gold not determined, but may be approximately stated as near 20 per cent.

The prismatic amalgam, which is the most abundant in gold mills, consists of short, prismatic crystals closely interwoven, seldom exceeding 1-16 inch in length, but generally microscopic. In cross-section the crystals are hexagonal but flattened. After treatment with acid and gentle ignition they show a bright but pale yellow gold color. The composition approximates 25 to 30 per cent of gold, this amalgam being more stable than the acicular and forming at ordinary temperatures, but becoming fluid in an excess of mercury at about 100°.

The octahedral amalgam occurs in small single or grouped crystals, generally in modified forms of the octahedron and cube, and contains a higher percentage of gold than the other forms, probably near 50 per cent. This amalgam forms slower than the others, and where the gold is in excess, or where the mercury acts upon larger grains of gold, and is the most stable of all the forms observed. It occurs frequently on placer gold, often covering entirely the surfaces of scale gold collected by amalgamation. After treatment with acid the gold from this amalgam shows a brownish-yellow color, which, upon ignition, changes to a bright reddish yellow, the crystals cracking in certain directions. The crystals are generally microscopic, varying in size from 1-100 to 1-15,000 inch. Traces of copper, probably derived from the plates, are found in most of these amalgams, but most frequently in the acicular. All the amalgams from gold mills so far examined contain crystals of the prismatic and octahedral forms, the first predominating. On the plates inside the batteries a large percentage of coarser grains of gold and rich sands are found imbedded in the soft amalgam by the forcible splash of the stamps, but even there, if allowed to remain in the batteries for some time, become permeated by the mercury and crystalline.

It is evident that time forms an element in all gold amalgamation, its progress depending upon the size of the gold particles. Very fine microscopic gold will enter in solution almost immediately and show crystals on the plates, and sizes up to one-fiftieth of an inch will be absorbed within 12 hours at ordinary temperatures. The largest portion of amalgam on aprons and plates is found crystalline through its mass except when running on rich ores, when the surface of amalgam shows imbedded grains of such sands, when the surface of gold exposed always greatly exceeds that of the quartz or rocky matter. In fact, where very fine gold occurs in an ore, scarcely any sand can be seen among the plate amalgam, and the whole presents a network of interwoven crystals. Amalgam from grinding-pans is generally perfectly crystalline; that from arrastres, while crystalline through its mass, exhibits coarse gold and sand, as here the amalgam becomes protected from grinding by lodging in the depressions of the bed.

These facts furnish evidence that of the gold passing through a stamp-mill or other crushing device, the larger grains easily settle to the bottom, a portion of larger grains and fine free gold attaches to the plates inside the battery, while scarcely any but the free purely metallic gold adheres to the plates below. It is doubtful if any grains of sand containing less than 50 per cent of gold ever become caught on the plates, while the bulk of rich sands continue on their course, as one writer (O'Driscoll in Notes on the Treatment of Gold Ores) quaintly expresses it, "to be carried off by the water into the tailings or down stream," past recovery by any except the cyanide process as applied to tailings.

The fears often expressed by writers on the metallurgy of gold, that the action of stamps tends to beat out the gold particles into thin flakes, appear from the testimony of the microscope to be entirely unfounded. The closest examination of amalgamation products fails to exhibit such action, except in the few instances where comparatively large gold particles have been observed flattened. This will further appear when referring to the grinding of ores.

Another amalgamation product common to mechanical operations in both gold and silver ores appears in the floured mercury of which so much has been written and so many speculations indulged in. Floured mercury must of necessity be produced in all operations where that metal is admitted to the crusher and the grinder, and without it there could be no efficient amalgamation. In fact, the particles of quicksilver should correspond to the size of the gold to give the best results. It is only when the flouring becomes excessive that a remedy should be looked for. Floured mercury consists of nearly spherical globules ranging in size from 1-100 to 1-5000 inch, seldom as low as 1-10,000 inch diameter, and under the microscope their surfaces appear coated with grains of mineral matter varying according to the ore and often containing fragments of pyrites and other sulphides, but in free-milling ores consisting mainly of grains of quartz and scales of talc. The globules almost invariably carry a nucleus of gold-bearing rock around which are crowded minuter fragments of mineral matter present in the ore. A globule 1-50 inch in diameter will often after treatment with acid develop over 100 particles of gold and rocky matter containing gold in still minuter forms, all the gold generally being crystalline or coated with crystals, the octahedral form predominating. Gold is always present in this form of mercury from a gold mill, ranging up to ten per cent, and averaging four per cent with low-grade ores. Above five per cent gold contents the globules become irregular in form, and at ten per cent quite pasty, in which condition they are often found about the batteries and head of aprons.

Floured mercury may be kept under water for an indefinite time, part of the globules becoming brown by oxidation, but when kept dry they gradually coalesce into a mass of mercury in which the gold exists mainly in solution, the mineral impurities forming a crust, often dense and black.

Independent of the action on mercury of the salts in solution in the pulp, and of the coating by mineral matter, some natural force relating to the spheroidal state of one fluid when immersed in another probably determines the main causes of repulsion between the globules, as when a number of them are lying in contact, and covered by water, will immediately begin to flow together when the water evaporates. Rich plate sands amalgamated enough to stick together in clusters will, if kept for two months in a dry and dust-free atmosphere, develop groups of beautiful prismatic crystals from every gold surface until all the mercury has united with the gold in a crystalline amalgam.

Whatever be the chemical causes that determine an excessive flouring of mercury, among which the presence of soluble proto-salts of iron appears most potent, an explanation thereof can also be found in the action of certain minerals which in a mechanical way prevent amalgamation particularly on plates. While clayey matter always is injurious by increasing the density of the pulp and enveloping the gold particles, talcose clays cause the most difficulties by their mechanical action on the pulp. They consist mostly of exceedingly minute and thin flakes of transparent talc with a little oxide of iron, and, diffused in the pulp, permeate it thoroughly. Being somewhat denser than quartz, the flakes sliding over the plates prevent their contact with the gold, while the upper stratum of the pulp contains them in a rolling motion. As talcose material is often found present in decomposed ores, even up to 50 per per cent, the loss of gold in such cases is large where battery and plate amalgamation alone is depended on. The recovery of the floured mercury must be sought by means of concentration, as a large percentage is easily saved both on belt concentrators and percussion tables.

Viewed from its best practice, the amalgamation of gold on plates is the crudest possible method of gold recovery, and the sooner it is relegated to tradition the better for the gold-mining industry. The ingenuity and money expended during the last 40 years on plates, riffles, wells, traps, stirrers and plate concentrators would, if applied in other directions, have gone far towards developing a rational system of amalgamation, and would have saved millions now practically wasted. Many of the smaller mines yet depend upon this class of amalgamation, and the writer is acquainted with one instance where a large quartz-mining district, running at one time 180 stamps, depended during many years on battery and plate amalgamation exclusively, and yet maintains the same practice on a smaller scale.

Under the conditions prevailing in battery and plate amalgamation, perfection could not be expected even if the character of the ore offered no obstacles, as enough time is not given for intimate contact between the gold and mercury in the rapid passage from the battery after being partially set free from its rocky matrix. Of the gold so freed a large percentage remains unaffected, and if of sufficient specific gravity will be saved on concentrators, otherwise becoming a waste product. Another portion, varying with different ores, refuses to be amalgamated under the conditions presented, mainly from the resistance offered by substances coating the gold surface in whole or in part. These, as shown by the microscope, appear to be: Fragments of pyrites and other sulphides adhering to the gold; thin coatings of oxides of iron on gold set free from decomposed pyrites, and of the oxides of lead, antimony and zinc from their sulphides. Oxides of manganese often form coatings, as also copper sulphides, especially copper glance. In some ores, mainly from veins in granite, a tenacious coating is found of an intimate mixture of oxide of iron (limonite) with wulfenite or anglesite.

The difficulty of amalgamating the free gold found in the ores of tellurides and selenides of gold and silver is well known, and this behavior with selenide ores has been fully confirmed by the writer's experience. The gold particles of all sizes appear clean and of a high gold color, but with a peculiar luster like that of lacquered brass. In one instance 90 per cent of this gold escaped amalgamation and showed scarcely a trace of mercury, and amalgamation was effected only by long-continued grinding under very smooth surfaces. All the tests made point to seleneous acid as forming this coating, a probable product from the oxidation of the selenium originally combined with the gold.

Condition of Cornish Mineral Industries.

Though subject to periodical fluctuations, Cornwall seems still able to maintain its fame as a leading metal-producing county, more especially in regard to tin. Time was when no other county in the United Kingdom could boast of being able to return copper in quantities equal to Cornwall, but for the last 25 years the product has gradually diminished in quantity, so that from a former annual value of about half a million, that obtained last year realized but £24,746 for 495¾ tons, and compared with the previous year even, a considerable decrease, seeing that the value of 719¾ tons realized £40,708, on an average of but £1 15s. 9d., against £1 19s. 2d. for the previous year, and the standard but £70 2s. 8d., against £76 10s. 6d. It is no wonder, therefore, that considerable attention is paid and large sums invested in the production and development of the kindred metal, tin. For many years vast sums have been expended in removing the primitive machinery of our forefathers and in substituting mining machinery of the latest and best type. This has enabled mining to be carried on at considerably greater depth than previously. As a natural consequence, the cost of producing the metal has risen considerably, but as a set-off the metal obtained is found to be of much greater value. Thus, in 1891, the quantity of tin raised and sold was 9353½ tons, which realized £881,139, whilst the 9251¾ tons brought to surface in 1892 realized for its owners £892,982.

The produce of other minerals is comparatively small in this county. For instance, lead, the accumulated gain for which has been but £105, and arsenic, 1086 tons for £1067, China-clay has yielded, and continues to yield, very well, in spite of all the difficulties and troubles recently arising from proposed amalgamations which did not prove successful. These works have produced no less than 408,492 tons, which, at the works, is valued at no less than £306,369. The whole of this was shipped with the small exception of 3581 tons, which made its way into the English centers.—Industries and Iron.

Mining in Central Placer County.

TO THE EDITOR:—The numerous quartz properties of central Placer county seem to be attracting more attention at the present time than for a number of years past. One familiar with the geology and minerals of this gold-producing section can only feel that they have been neglected or overlooked too long.

The adaptability of the climate and soil for early and citrus fruit-growing seems to have turned all enterprize and thought to their production and shipment for eastern and even foreign markets.

The little mining that has been done (some one has more appropriately than poetically termed it "grass-root mining"), when applied to quartz-mining, means no mining at all.

The late sale of the Three Stars mine and other properties in the Ophir district, to a Colorado company for a very large sum of money (in silver) promises the commencement of active and thorough mining in this section. A shaft is being sunk on Bald Hill, where a regular fissure vein is known to carry heavily mineralized quartz. Bald Hill district has so many fine-appearing quartz ledges, and it has always been so bewildering to miners, notwithstanding the fact that a great deal of gold has been taken out, that no extensive work has ever been prosecuted on any one vein.

Although quartz ledges are known to abound on either side of the slate and granite contact which extends north from Bald Hill into Nevada county, no prospecting of any significance has been done south of Wolf creek. Why, is more than any one can tell. A ledge over 23 feet wide has been sunk to the depth of 40 feet and is known to carry more than enough gold to pay for working. The owner, more interested in tilling the soil than mining, has never made any disposition of it. Such properties in the hands of practical and experienced mine managers would yield dividends on their working and inevitably add impetus and life to their surroundings.

Much is always said about every good-paying mine, especially when it has been a bullion-producer so long that no one can withhold full confidence in its permanency, while with undeveloped veins quite the reverse is true. The question is, "Who is to determine where it would be advisable to invest money, testing the mineral value of exposed veins?"

In looking for an answer, but one thing suggests itself. The idea is of a "county geologist and mineralogist," who, in connection with the "county surveyor," having an office in common use, could acquire positive information and data which would attract intending purchasers or their agents and experts from every mine-purchasing center of the world, depending only upon the accessibility and reliability of its information.

This in counties where minerals in endless variety are as abundant as in Placer and many other counties in California would serve a broader purpose than a superficial consideration might suggest. While the State geologist might furnish much such data, many details of the most importance must be omitted. The volume of such accumulations has lately been a matter of State concern, and suggests that something else be adopted. A detailed report of just the geological and mineralogical facts of almost any particular mining district in this State would fill an ordinary volume, and, where mining is prosecuted, developments would add to the accumulations. This makes it desirable that local districts acquire maps, charts and data, which, owing to their volume, the State could not be expected to produce.

This idea may not be new, but certainly has not met with any very general comment from the press of the State. Only a small portion of the minerals mined from the earth's crust is used for coins, and, should agitation ever produce a moneyless nation, it would not stop the mining for such minerals as are necessities in civilized life. Salt eating has removed savagery and elevated the "tastes" of man in many particulars, demanding the utility of all the known elements that must come from but the one source—the ground. Give us more positive knowledge of the formations, and increased production is assured.

Auburn, Aug. 9, 1893. J. C. HAWVER.

Sewage Farms in California.

The disposition of sewage is a question of the greatest importance in cities and towns beyond tide-water connections. The difficulty of proper undertakings is the reason why many towns and villages are uncleanly, and their inhabitants a prey of zymotic diseases. The following notes on what some California towns are doing, as recently described in the *Engineering News*, should interest many of our readers:

A very interesting example of the use of sewage for irrigation is found at Fresno, Cal., where the city pays $5000 per year for the disposal of the sewage, and the fortunate man who receives the money distributes the sewage over land which he rents to Chinamen for market gardens.

Prior to the construction of the sewers the city trustees thought the disposal of the sewage the great obstacle to be overcome; therefore they called for propusals to take care of the sewage for five years, the successful bidder to give a bond of $10,000 to protect the city from all damages which might arise therefrom after its delivery at the end of the pipe. Alexander McBean, of Oakland, was the lowest bidder, and his bid of $5000 per annum was accordingly accepted. The contractor purchased 80 acres of land at the eod of the outlet sewer, and for one year the sewage ran upon that land without any attention or care, except when occasionally some neighbor saw fit to take it for irrigation. The second year the contractor constructed ditches and leased the land to Chinamen for vegetable gardens, and for two seasons it has been used for irrigating gardens and vineyards.

Mr. H. Burley, of Fresno, superintends the renting of the land, which is all under cultivation with all the various kinds of vegetables commonly in the market, such as potatoes, yams, parsnips, lettuce, celery, beans, peas and corn. It is customary to irrigate vegetables in furrows only. Trees and vines would be irrigated in furrows also. Grasses would be flooded, but we have no knowledge of sewage being used on grasses.

Mr. Burley, the superintendent of the farm, states that he can see no difference between irrigating with sewage and clear water. It is possible that the land may produce good crops longer by the use of sewage, but that is to be proved. The general impression is that sewage is superior to water for irrigation. The sewage farm is an exceptionally poor piece of land, but it produces pretty well with sewage irrigation.

When put upon the land, without more dilution than is given by the flushing water, unless the land is cultivated within a day or two, there is quite a stench, but when cultivated this disappears.

When not needed on the farm, the sewage is allowed to float in the irrigating ditches for miles beyond, it which way it becomes very much diluted, and in the irrigating season is used throughout the country below the sewage farm proper.

The sewage farm of Pasadena is owned by the city, and comprises 300 acres of land situated about four miles from the city in a southeasterly direction, in a well-settled part of the valley. The soil is a sandy loam, mixed with some alkali. It has the capacity of absorbing a considerable quantity of water. It is estimated that for the present only 40 acres will be required for the disposal of the sewage, but the latter may be spread over a much larger area for the purpose of irrigating crops on the remainder of the farm.

It is the intention to devote the land irrigated with sewage to the raising of vegetables, berries and citrus fruits, and perhaps walnuts and alfalfa hay. The latter yields about seven crops per annum, or about ten tons per acre, and is sold for $10 to $15 per ton. It stands any amount of irrigation at all seasons, and the sewage may be crowded on it at any time. Vegetables are calculated to yield $25 net per acre, while berries, as a rule, yield from $100 to $200 per acre per annum. Citrus fruits often net from $150 to $400 per acre per annum. With sewage irrigation, these figures may possibly be exceeded.

The sewage is taken from the sewer in much the same manner as water from irrigating pipes by the simple closing of a cast-iron slide gate, built into a manhole, through which the pipe leads. The sewage is thus backed up into the sewer until it rises nearly to the top of the manhole, whence it finds its way through a joint of sewer pipe into the main carrier, an earthen dish 20 ins. wide at the top, 10 ins. at the bottom and 10 ins. deep. This carrier has a grade from 4 to 6 ins. in 100 feet. The land which the main carriers cover is divided into fields 100 ft. in width, and from 200 to 400 feet in length. The slope of the fields at right angles to the main carriers is 1½ to 2½ ft. per 100 ft. To irrigate the fields a dam of earth or of redwood board is inserted in the carrier at the lower end of the field, and the sewage is thus diverted into numerous small furrows from 3 to 6 ins. deep and 1 ft. apart, previously made with a common cultivator. Each field is expected to take the sewage for at least 12 hours. After the first soaking the dam is removed and the next field in order will receive its charge, and so on. As soon as the ground permits it, say, in about two days, field No. 1 will be thoroughly cultivated, to keep the ground from baking hard and to allow the air to act upon the soil. This is the common course adopted here for irrigation with pure water.

Fruit trees are planted in regular lines about 20 ft. apart each way, which permits the manner of irrigation here described. The side and bottom walls of the main carriers will be raked over with a garden rake whenever it becomes necessary to prevent the ditch from becoming foul.

Berries are to be planted in rows about 8 ft. apart, and the sewage will be led in between the rows so that the ground can be well cultivated. Vegetables may be planted in single or double rows, as the case may require, and the sewage will be conducted in between the rows or fields in flat trenches, which are to remain filled until the ground from trench to trench is thoroughly saturated with the sewage water, when the trenches will be drained, and after having dried off sufficiently they will he cultivated.

Redding is one of the smallest towns in the United States using sewage for irrigation, or having a sewerage system. It was the original intention of the town to discharge its sewage into the Sacramento river, but objection was made at Sacramento, where water is taken from the river to supply the city, and the State Board of Health gave notice to the authorities of Redding not to discharge the sewage into the river. The town authorities thereupon requested bids for taking care of the sewage, and a contract was entered into for a term of 40 years, the sewage to he disposed of at $300 for the first year, the amount of yearly payment thereafter to increase in proportion to the increase of the assessment roll.

The contractors immediately purchased a tract of about 100 acres of land within the corporate limit, and prepared a portion of it, about a mile from the built-up part of the town, for the utilization of the sewage by irrigation. The land selected is comparatively level and the soil a sandy and gravelly loam 4 to 6 ft. in depth, underlaid with gravel. Land better adapted to the purpose would be hard to find. About ten acres have been prepared for irrigation by leveling and constructing open carrier ditches, elevated above the surface of the land to be irrigated.

The sewage is applied directly to the land by the broad surface irrigation system, either by being run in furrows between rows, or spread over the surface, according to the requirements of the crop. The sewage has been applied to various crops, grain, asparagus, potatoes, turnips, beets, orchard and some garden truck. It has been principally used in raising fruit trees for nursery stock, the young trees being irrigated between the rows. About five acres are used as a nursery.

Generally the land is cultivated as soon after an application of sewage as the soil becomes dry enough. Part of the year it is necessary to put the sewage on land on which no crops are growing. It is then customary to run the sewage on the same piece of land several days in succession, and after it becomes sufficiently dry to plow or cultivate it. This is more particularly the case in winter, when there is sufficient moisture for crops without irrigation.

The sewage is not allowed to flow continuously onto the land, as too much time would be required in taking care of it, besides which the ordinary flow is not of sufficient volume to operate successfully. A reservoir was constructed at the outlet of the sewer, at the upper line of the sewage farm. This reservoir has a capacity of 75,000 gallons, which is about equal to the daily sewage flow in the dry season. Each morning the outlet to the reservoir is opened, and the contents discharged in from two to four hours, as desired. The bottom and sides of the reservoir are so constructed that everything gravitates to the outlet, and special cleaning is seldom necessary. An abundant supply of water from the town water-works is at hand for use, if required. The reservoir is covered with a rough board structure, and a vent chimney of lumber is carried to an elevation of about 60 ft. This has been sufficient to prevent any nuisance, and none is complained of, although the reservoir is alongside the public road.

No difficulty has been experienced in preventing a nuisance on the irrigatad lands. Care and attention to secure proper distribution and cultivation are required, and with these the results have been satisfactory. There is sometimes a slight odor in the immedlate vicinity of freshly-irrigated land, or where it is ponded previous to its subsidence into the soil, but this odor is not noticeable at a distance of 200 feet.

Copper Smelting in Russia.

At the Bozoslovsk Works in Russia, purchased from the Crown by the present proprietor, Mr. Polovtzof, about ten years since, the converters in the Bessemer shop are arranged in two groups of four, each group having two reverberatory smelting furnaces. When in use, one converter is blowing, a second is under repair, a third is cooling, and the fourth warming up. The operation is performed in two stages—in the first the coarse metal, by the elimination of sulphur and iron, is reduced to fine metal, and in the second the sulphur in the latter is oxidized, bringing it to the state of blister copper. In the first operation 32 cwt. of coarse metal, with 20 per cent of copper, melted in a reverberatory furnace, is run into the converter and blown for 25 or 30 minutes. By the burning of the sulphur and iron, the temperature rises rapidly, and a yellow flame, with violet edges and filled with very bright sparks, issues from the mouth of the converter. As the iron decreases, the flame drops, and finally becomes green, when the operation is finished and the charge is poured into molds, where the slag and regulus separate in cooling. The latter averages about 64 per cent of copper.

In the second operation the white metal of the first blowing is re-melted and blown to blister copper. This requires a longer time and is less easily affected than the first conversion, as the only combustible constituent, sulphur, gives such a small amount of heat that there is danger of the charge setting. It is, therefore, necessary at times to raise the temperature by throwing in charcoal, and two men are continually engaged in keeping the tuyeres open with iron prickers. The blow lasts from one to one and one-half hours, and is considered to be finished when no unchanged regulus is found in the projections, collected on a shovel inserted into the converter. The flame, which is at first green, changes at the end to a reddish-yellow. The slags, containing five to six per cent of copper, are poured out first, and afterward the blister copper, which is refined in the reverberatory furnace in the usual way.

In the same converter, three or four consecutive blows for white metal are followed by two for blister copper, and two or three more for white metal, the object of the alternation being to remove any masses of copper adhering to the lining. The average assay of the blister copper from the converter is 96 per cent. In 1890, 5013 tons of 19 per cent coarse metal were converted in 3825 blows into 1549 tons of white metal, and the latter by 887 blows into 746 tons of blister copper.

Hydraulic Cements and Concrete.

In the construction of electric light and power stations (says Alfred O. Doane in *Electrical Age*), it is of the utmost importance that firm foundations be provided in order to secure the best results. As cement enters largely into the construction of foundations for buildings, machinery, etc., a few words on the subject of cement and its uses may prove of interest.

Two principal varieties of hydraulic cement are used in engineering work—natural cement, also known as American, or Rosendale cement, and Portland, or artificial cement. The former is made by burning a shaley limestone in kilns and grinding the clinker produced with burrstones to a very fine powder which, when mixed with water, soon sets and forms an artificial stone nearly as hard as the original rock.

Portland cement is made by combining chalk, or some other form of limestone free from magnesia, with silicious clay; these materials are intimately mixed and made into bricks which are burned in kilns with coke fuel at an intense heat. The resulting clinker is ground in the same manner as natural cement, and is much stronger and sets quicker than Rosendale cement.

In using cement it is important to determine its quality, as, owing to the process of manufacture, it is liable to considerable variation. Cement is also injured by dampness or by keeping too long before using.

The tests usually applied are, first, to determine the fineness of the cement, which is very important, as only the finest dust has any hydraulic qualities; the coarser particles acting like sand. A small sample, about four ounces, is passed through a sieve having 2500 meshes per square inch; the residue remaining on the screen should not exceed eight per cent for American or five per cent for Portland cement. Some engineers also use a screen with 10,000 meshes per square inch. In this case the residue should not exceed 18 per cent for American or 15 per cent for Portland cement.

The other test is for tensile strength.

The cement is made into briquettes, in molds having a central section of one square inch. The cement may be mixed with water alone or with varying proportions of sand. These test pieces are kept in water, after they have set for 24 hours, seven days, or one month, according to the length of the test desired; they are then broken in a machine designed for the purpose, and the force required to pull them apart noted in pounds per square inch.

A good American cement should have a tensile strength of at least 65 pounds per square inch, 24 hours test without sand. For Portland cement, under the same conditions, 125 pounds should be required.

One of the largest uses for hydraulic cement is in making concrete. The material consists of a mixture of cement, sand and gravel or broken stone. It is much used for foundations of all kinds. It is more durable in moist ground than brickwork, and is, of course, all in one piece, with no joints to fail or leak; it is easily laid and is considerably cheaper than brick or stone masonry. The strength and quality of concrete depend largely on the care and skill used in laying it, and in rightly proportioning the materials used.

The proportions commonly used are as follows:

One barrel cement,
Two barrels sand,
Four to five barrels gravel or broken stone.

The sand should be sharp, gritty and free from loam, dirt or fine sand. The gravel should contain no pebbles which will not pass through a 2½-inch ring. The sand and cement should be well mixed, dry, then enough water added to make a stiff motar. The stone or gravel is then moistened, and thoroughly mixed with the mortar by turning over in the bed with shovels and hoes; this should be done three or four times. The concrete is then shoveled into wooden molds, of the shape desired. In order to obtain the strongest work the concrete should be laid in six-inch layers, as dry as possible, and have it work well, and each layer well rammed until the water flushes to the top. In order to make a foundation extra strong and bind it together, old iron rails or rods are sometimes incorporated in the mass and dowels, for holding cap stones or engine beds, could be inserted in the soft concrete in the same manner.

Concrete should be allowed to set for 24 hours at least before moving molds or disturbing it in any way. If laid in cold weather it requires much longer to set and if the temperature is below freezing the sand, stone and water should be heated and the work covered from the frost until entirely set.

By the use of concrete in connection with a timber crib-work, heavy foundations may be successfully placed in very treacherous ground, such as quicksand or peaty soils.

New applications for concrete are being found all the time and a knowledge of its valuable properties will often be of use in all branches of engineering.

Russian Platinum Production.

The available information as to the Russian platinum industry has been increased by a visit made by Mr. George F. Kunz to the district and described by him in the recently published report of the mineral industries in the United States at the eleventh census. The two deposits in the Ural mountains are the Gorn-Blagodat or Isa region, in the basin of the River Isa, and the Nisjne Tagilsk or Demidoff district, on the Martin river. The former is

under Government control, while the latter is worked by private enterprise. In the latter field there were three large washing plants and a fourth is being erected. Besides these the peasants have many small workings for which they pay two-thirds of the produce as a royalty. The deposits are placers composed of serpentine boulders mixed with chrome iron ore, the platinum-bearing sand forming a layer of 6 to 10 inches in thickness on the bedrock at a depth of 30 to 40 feet. The sand is mined by driving levels from a shaft and is only worked in the winter, when the washing plants have to stand idle, as the water is all frozen. For washing the material it is hauled in cartloads of about 1500 pounds and emptied into a revolving screen. The small stuff is stirred up in water by two women, and the heavier materials settle in riffles in the troughs. Both the tailings and the heavy sand are re-washed. In two shifts of 12 hours—each shift, however, including four hours' rest—about 640 tons of sand are washed, yielding 2.7 pounds of platinum in each machine. The average daily yield of the whole of this district is about 9 pounds, worth about £2 per ounce, and the yearly production is about 1620 pounds. No details of the cost of mining are available, but the cost of labor for washing in the three plants for the 180 days during which the work could be done is about £7000. Wages are not extravagantly high, as a driver gets 1.3 roubles a day for himself, horse and cart, and he has to haul 60 loads daily. For each machine 40 drivers, besides 16 workmen at 70 kopeks each and 4 women at 40 kopeks each, are employed.

California Methods of Irrigation.

A very interesting review of irrigation methods is given in a publication just issued for the use of delegates to the Irrigation Congress to assemble in Los Angeles, October 10th, entitled "Irrigation in Southern California," by Harry E. Brook. The methods originated in that part of the State, but they are now common in the State generally wherever the artificial application of water is resorted to. The condensed description will meet many inquiries which we receive regarding California practices.

The extent and location of the lands to be irrigated must first be determined with approximate accuracy, in order that the money return from the sale of water may be estimated and placed against the cost of obtaining it.

The various hydrographic problems must then be studied in the field, with some degree of detail, including questions of rainfall, storms, evaporation and sediment carried by the water. Detailed topographic surveys are then necessary. If storage reservoirs are to be constructed, an even greater degree of engineering skill may be required. The character and nature of the construction of the dam will differ in every case.

Irrigation is an art that must be learned. It has been brought to the highest perfection in southern California by men of means, who have tried all known systems.

Water for irrigation is obtained from running streams; by storing water in reservoirs constructed in the mountains or foothills; by tunneling into the mountains; by building underground dams to force the subterranean flow to the surface, and by boring artesian wells. Water is also occasionally pumped from wells, on a small scale, by windmills or by steam engines.

The first supplies of water used for irrigating were derived from running streams that were easily diverted. No expensive dams or other works were built, and economy in handling the water was not deemed necessary. Such streams were not numerous in this section, and over 25 years ago successful experiments were made in the search for artesian water. Water storage in natural lakes or depressions, or in reservoirs built on drainage lines, was next undertaken. This system, when the works are judiciously constructed, is the most reliable of all. Several streams of considerable size have been developed by tunneling into the mountains. Where streams have little or no flow in summer, trenches have been sunk to the bedrock, across the stream, and a dam there constructed which has forced the underground flow to the surface.

The next step in irrigation is the application of water to crops. The methods used may all be reduced to three—flooding, small furrows and basins—the choice depending upon the soil and the amount of water available. In southern California the furrow system is now used almost exclusively. It is considered by far the best, as its effect resembles that of a slow, soaking rain. The check or basin system is sometimes used where the surface is rolling or steep. For steep hillsides a method of irrigation by curved furrows has lately been introduced in southern California. Cemented canals and wooden flumes are largely used. Sub-irrigation has been a total failure practically, the roots clogging the pipes.

The processes of irrigation in southern California may be classed under three heads: (1) Frequent irrigation with rare cultivation; (2) medium irrigation with medium cultivation; (3) rare irrigation with frequent cultivation. The first may be termed the method of the pioneer, the second the method of experience, the third the method resulting from education. The primitive Mexican farmer wasted as much water in growing a half acre of beans, corn and melons as is now found ample to thoroughly irrigate 20 to 40 acres of oranges or Muscat grapes. The change has been brought about by experience, education and a free use of the cultivator.

The quantity of water used per acre varies greatly. It depends on the crop, the soil, the rate of transpiration and the judgment of the irrigator. Alfalfa grown on mesa soils probably requires the maximum and olives the minimum. Citrus trees usually require more water than any other trees, and are generally irrigated every four weeks during the summer. The supply of water per acre varies in the different colonies. At Ontario, Pomona and Cucamonga one inch to ten acres is stipulated; Rialto, Redlands and the proposed Victor project have one inch to eight acres; Riverside, Santa Ana, Highlands and several other settlements use any amount which the irrigator chooses to order and pay for. Some districts are contracting to furnish one inch to five acres.

The term here used in water measurement, one inch, means a steady flow of water through an aperture one inch square, under a four-inch pressure, and is identical with the term "miner's inch," as commonly used in California. This flow yields in round numbers nine gallons per minute.

The preparation of virgin soil for an orchard or vineyard to be irrigated after planting varies little from that of land which depends on rainfall. If the soil is light and porous, it is desirable to have quite a fall to the land, so that water in the furrows may be run swiftly over the soil, while on a heavy soil it is necessary to have the ground nearly level so that the water may be run very slowly, thus thoroughly soaking the ground. Trees are usually planted 20, 22 and 24 feet apart. Furrows are commonly opened between these trees by taking off the teeth from a six-foot cultivator and placing a small shovel at each end and one in the center, thus making three furrows, each two feet apart, at one trip. The growing limbs usually extend so far out from the trees that two sets of furrows are all that can be made. Into these six shallow furrows the water is turned from the flumes or head ditch and is allowed to run 24 to 48 hours, according to the nature of the soil, until the ground is perfectly soaked. The cultivator is started as soon as the horses can get on the ground after the irrigation, and the soil is kept perfectly pulverized until another irrigation is deemed necessary.

In southern California, orange trees are usually irrigated about six times annually; apricots, peaches, prunes and Muscat (raisin) grapes three times; and olives and corn once; while alfalfa is generally flooded after every cutting, which is from six to eight times every season.

Irrigation for grain is never resorted to in southern California, the "glorious climate" making it possible for the grain farmer to plow in December, sow in January and harvest in May, the usual winter rains from December to April being ordinarily amply sufficient to make a first-class crop of wheat or barley. Sugar beets are not irrigated.

Vegetation on Slickens.

Some years ago a tremendous howl was raised against the hydraulic miners because the slickens was utterly and forever and irretrievably ruining the bottom lands, because of the fact (?) that nothing would *ever* grow on slickens. We made trips over the slickens-covered ground and were told that such land would be forever desert. We believed it and joined the howl against such ruinous practices. Others were fooled, and there were enough of us fooled to get the hydraulic mines closed down.

Now, after all these years, we find we were misled. That slickens can be, and is, sweetened after a time, and that vegetation will flourish on soil composed wholly of slickens. Hear what the Oroville *Register* has to say:

"Surveyor McCoy has an observing eye, for ladies as well as for lands by the way, and while out surveying the Pentz ranch a short time ago he saw where slickens from the famous Cherokee or Spring Valley mine had filled a part of Sawmill ravine to a depth of fully 100 feet. On top of the vast bed of detritus, and far from any water, was growing alfalfa as green, vigorous and thrifty as on the richest and best-watered river-bottom in the State. Mr. McCoy is convinced that the great mass of debris covering the present bed of Dry creek will in time become valuable land for growing alfalfa, though it to the eye now presents a bare, bleak white waste of soft sand and slickens."

If this picture represents the case correctly, we distinctly desire to be understood as withdrawing all former objections to hydraulic mining. Let the gold be taken out of the hills, where it does no one any good, and be set to work fructifying the broad fields of trade and stirring up the arteries of commerce. Let the slickens be conducted down upon the swamps, marshes and lowlands until they are filled and rendered fertile and productive. We need the gold worse now than ever before, and we feel satisfied that the work can go on without detriment or permanent damage. The new facts elicited reverse our decision of those years agone.—Redlands Citrograph.

Mining With the Steam Shovel.

When the Mesabi range first was exploited, says the *American Manufacturer*, all sorts of estimates and talks of cheap mining were indulged in by its exponents. Some proclaimed that the older ranges would not be in the race with the new discovery, and that the latter would have its own way in the iron business. Stripping with the steam shovel and actual mining therewith were pointed to as among the chief reasons for cheaper winning of the ore. All these claims of course brought out expressions of opinion from the older ranges in contemptuous rebuttal of the charges that they would be "shelved." Perhaps the steam shovel claims received more of their attention than any other feature, and the idea was ridiculed that this method of mining should be at all generally feasible on the new range.

While no doubt some wild and unsubstantial claims were made about the cheapness of mining which was to rule on the Mesabi, it seems as if the steam shovel is to be a factor of no little importance, at least on some of the properties, particularly on the Biwabik, where it has proven successful, even though the covering there is heavier than at any other place where the plan has been attempted. Some figures are given by the *Mesaba Range*, which feels pretty good over the result, and we reproduce its calculations here. At the Biwabik it is known that there is 20,000,000 tons of ore in sight. It is known that every yard of earth removed will uncover five tons of ore. It is known that this stripping can be removed for less than 50 cents per yard—say 40 cents on an average. This cost divided makes a cost of eight cents for stripping a ton of ore. It is confidently expected that as soon as the system is perfected one shovel can easily load 1000 tons per day—some claim as high as 2000 tons. A steam shovel requires an average of 30 men to operate it and keep it in cars. Make due allowances for costs of mistakes, for incidental expenses, for accidents—for extravagance if you will—and still the cost will figure up less than half the cost of the cheapest old-method mining.

Traits of the Mine Mule.

"Even when a mule is an ordinary open-air mule he is full of surprises, as every one knows," said the Hon. James A. Sweeney, the Hazleton philosopher and ex-statesman, "but it is not until he gets to be a mine mule that his genius buds and blossoms and makes itself apparent in ways that are really startling. A life spent underground hauling coal cars seems to develop in a mule sense and traits that no one ever knew to be in evidence in a mule doomed to an inglorious career as the motive power of a canal boat or a tannery-bark wagon. Strange as it may seem, there is something in the perpetual darkness and uncertain atmosphere of a coal mine that is elevating to the character of a mule, and makes him superior, mentally and physically, to his brother who brays and kicks in the broad sunlight half a mile or so above him. A mine mule is always sleek and fat from his earliest days underground until he is killed by a fall of coal or an explosion of gas, or is drowned in a flooded mine. He never dies a natural death. Ask any coal miner and he will tell you so. That is, he never dies as long as he is in the mines. I have known many mules that had been in the colliery depths for 35 and 40 years without once seeing the daylight, and they would probably be there now if fate hadn't at last overtaken them in a fall of roof or sudden explosion. The oldest mine mule on record, though, was Pioneer Dan, the first mule ever sent below by the Delaware and Hudson Canal Co. He went to work in the original coal mine of that company at Carbondale in 1829, I think it was, but it might have been a year or two earlier. Dan was anything but a colt, they say, when he went into the mining business, having worked on a farm near Carbondale for some years before. Hundreds of mules were killed in that old mine during the 67 years the company worked it, but Pioneer Dan seemed to have been born under a lucky star, for he escaped all the accidents that beset mine-toilers, and when the company abandoned the mine, because it was worked out, it brought Old Dan up from the depths looking as youthful and glossy as he was the first year he went in.

"In all his life beneath the ground, Dan had only been on the surface once before. That was when the miners struck for some reason during the war. The company refused to comply with the demands of the men, and shut down the mine. It brought all its mules to the surface and turned them out to pasture. But the mules refused to eat anything, although they were in rich green pasture. Matter-of-fact folks said it was because the animals were blind from long confinement in the darkness a thousand feet or so in the bowels of the earth, and couldn't see the tempting food that was all round them knee deep. But the fact of the matter was that the mules were in sympathy with the strikers, and they had deliberately resolved to starve rather than aid the company by eating, and thus saving it the large amount of money they were collectively worth. Mules were scarce and very high then, the demands of the Government for those animals having cleaned out the market. Day after day those mine mules fasted in the midst of plenty, until the company, fearing that they would all die on its hands and inflict a loss of several thousands of dollars on the corporation, and knowing besides that it would have great difficulty in replacing them, acceded to the demands of the strikers. No further proof of the reason the mules refused to eat was needed when, on the day the news that the men had won got around, they turned to and went to cropping their pasturage with unmistakable gusto.

"Well, as I said, when old Dan came out of his mine the last time, and for good, he was as youthful looking, fat and glossy as he was in his first year in the mine. He was a bright bay, and his eyes were bright, although he couldn't see in the daylight. But mark the change that came over him. In less than 24 hours after he came out of the mine he turned as gray as gray could be. His face wrinkled up like a piece of tripe, and his eyes lost all their luster. In short, in that brief time he passed from the apparent heyday of youth to the last tottering stages of decrepit old age, and died at sunrise of his second day above ground. As near as any one could calculate, this pioneer mine mule was 63 years old.

"Then there was the mule Barney of the Old Hickory colliery at Coalbrook. He went below in 1853. He never saw daylight again until 1888. Then the coal company thought Barney had done his duty, and he was taken out of the mine and turned loose to do as he pleased for the rest of his days. The company might have known from the mournful and wistful way he hung about the mine and brayed when he saw his old companions, the miners, going down to their work, that it was doing him a mistaken kindness, but the company didn't see it. Old Barney was simply breaking his heart pining to get back into the black depths where he had been happy for more than a generation, and at last, seeing that they wouldn't put him back, he went one day to where some men were blasting out rocks, not far from the mine, and, watching his chance, placed himself in the way of a heavy blast and was killed by the flying rocks. If Barney hadn't been a mine mule his death could truthfully have been put down as the result of stupidity and thick-headedness on his part. But he was a mine mule, and consequently he put an end to his heart-breaking home-sickness by deliberate suicide."—New York Sun.

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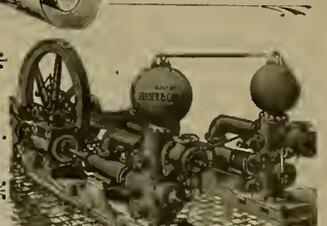

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Is riveting done by a hydraulic riveter any better than that done by a steam or pneumatic riveter? We are led to propound this question by hearing the manager of a locomotive building establishment having a very high reputation for the quality of its work declare emphatically that the work done by hydraulic riveters was much superinr to that done by the other two machines. He gave as reasons for this opinion that with a wide gap riveter there is of necessity considerable spring to the jaws when pressure is turned on. With the steam or air riveters the force back of the piston is elastic and the tendency of the plates to spring apart and the yielding of the frame of the riveter may result in a minute opening of the plates. In other words, conceive the work done by the riveter to be the compression of a spring. A steam or air riveter would strike a blow upon the spring, would compress it a little beyond the point where the resistance of the spring equaled the pressure of the air or steam, and then would spring back slightly. The hydraulic riveter, on the other hand, keeps all it gets. It is a steady pressure and no reaction is possible.

A second reason, and one which appeals with more force than the first, is that the hydraulic riveter cannot be pulled off the work as quickly as the steam or air machines, and the rivet has more time to cool and gain strength sufficient to hold the plates in position before the pressure is released. Even with the hydraulic riveter, it is claimed that men are apt to release the pressure too soon, and thus permit the plates to open, and the rapidity with which an expert gang can drive rivets with a pneumatic machine is well known.

Are the reasons valid, and is it a fact that hydraulic riveted work is stronger and tighter than pneumatic nr steam riveted? Or, to put the question in another form, is the riveting done in the first-class bridge shops any worse or better than that done in the best boiler shops by hydraulic machines? Of course, it must be conceded at once that so high grade work in the riveting is not called for in structural work as in boiler work. It is better by far to do rapid work and compensate for any loss in strength by using a little heavier metal and larger rivets; and in doing rapid work, an occasional rivet head is likely tn be off center.

But, notwithstanding this, there is some reason to believe that the work of the bridge shops at the present day need not fear comparison with that of the boiler-makers. For a sample of bridge-builder's work we suggest to our readers who are visiting the Columbian Expnsition that they examine the section of the top chord of a 440-foot bridge span in the exhibit of the New Jersey Steel and Iron Co., and notice the fit of the rivets in their holes. As a general rule, nowadays, bridge engineers are specifying that rivet holes shall either he drilled or shall he punched small and reamed after the pieces are assembled, and the rivet must fit its hole within 1 32 inch. In some cases, pains are taken to countersink the sharp corner of the hole under the rivet head. The result is a junction between the rivet and the plates so close that the dividing line can scarcely he discovered.

Now, contrast with this the fact that very common practice among boiler makers of punching holes without reaming and using the driftpin to correct the inevitable inaccuracies. Even the warm advocate of hydraulic work, to whom we alluded above, confessed he was punching all his plates and doing no reaming; and he defended the practice by saying that he allowed a large enough margin of strength in plates and seams to make punching permissible. We record these facts without prejudice in favor of either side, and, if any of our readers have further information of value hearing on the question, we shall he pleased to give space to their communications.

One of the Niagara Turbines.

One of the turbine wheels to be used at Niagara Falls is described as follows by the *Electrical Engineer:*

The wheel is of the new type on horizontal sbaft, and what is specially known as the new double-discharge turbine. The water is conducted to the wheel from a canal near the top of the cliff by means of an eight-foot pipe, made of steel plates, extending in nearly a perpendicular line to the mill, which is designed for two separate power plants. The water enters the large flattened cylinder casing at the bottom and circulates around the wheel and its guide casing, and is admitted to the wheel proper or runner, which is placed upon a horizontal shaft, the motion being vertical. The wheel, or runner, is in reality a double wheel, which splits the water or divides it into equal quantities on receiving it from one set of gates.

After the water has operated upon the runner it is discharged horizontally and in opposite directions, immediately passing in a downward direction through the curved elbows, to which are attached draught tubes on each side of the wheel casing. These tubes are extended down to a distance of some 18 to 20 feet from the center of the wheel shaft, thereby operating to some extent through the atmospheric pressure, in connection with a hydraulic pressure above the wheel.

The runner is made of steel, iron and brooze, the segments carrying the buckets being bronze and weighing 1¾ tons. The whole runner weighs nearly four tons. The runner is made of such diameter as to secure 230 revolutions per minute, under a practical working pressure of 130 feet. There are no gears or belts for communicating the power to the machinery, but at each side there will be connected two grinders, or four in all, requiring about 1000-horse power or 250-horse power each, in addition to which there is considerable other machinery driven independently of the grinders.

The whole arrangement is of original design and is constructed in the strongest and most substantial manner upon a guarantee as to durability and as to specific performance of work. The entire weight of each plant of wheels is 28 tons.

These are the only American design and pattern of wheels that have yet been put under the extreme height of head existing at Niagara Falls, and they are therefore the first turbines running under that pressure.

Submarine Boats for the Navy.

A few weeks ago the Navy Department opened proposals for constructing a submarine boat and the answers received were submitted to the board of naval experts. The board has made a report in which they say that of all the plans submitted but two appear to be promising of practical results.

The two boats selected for examination have some points of resemblance in general aspect. They are of the same size, measuring nearly 150 tons when submerged. Each used steam as the propelling power when on the surface and electricity, supplied by a storage battery charged by the main engines, when submerged. When they dive under the water both boats house their smoke-stacks and seal all openings with iron plates.

The essential feature of the one known as the Baker boat is the propelling apparatus, which also serves to submerge her. This consists of two screw propellers, one on either side, so arranged on a transverse shaft passing through the middle of the boat at the center of gravity that they can be turned at different angles. When the boat is to be submerged these propellers are turned upward and drive the hull under water, and when the desired depth has been reached the angle is adjusted so as to drive the boat along in a horizontal line. By revolving them slowly the boat can be maintained at any place.

The Holland boat depends for her submersion on what are known as fin rudders. They are arranged in a horizontal plane and when the propeller at the stern drives the boat ahead a slight inclination of the rudders will cause her to dive beneath the surface. This boat has another rudder, arranged so as to cause her automatically to steer a straight course when under water. She also has a regulator for her fin rudders made on the plan of a Whitehead torpedo, which will keep the boat at any desired depth while she runs along under the water. Each of the boats is fitted with tanks filled with compressed air, which will insure a quick return to the surface in case of any derangement of the propelling apparatus. The Baker boat is designed to make a speed of twelve knots above and ten knots under water, and the Holland boat to make fifteen knots on the surface and eight knots beneath.—Iron Age.

RAWHIDE COG WHEELS.—The problem of silent machinery running appears to have been brought a step nearer solution by the introduction in Austria of cog-wheels made of pressed rawhide, which are to work in conjunction with wheels of cast iron, steel and other metals. The new wheels are said to possess great strength. They do not require lubricating, and are, therefore, clean in operation. It is claimed that they substantially reduce the vibration of the machinery in which they are used. They can be had ready made or in the form of rawhide disks for shaping by the purchaser. They are supported by a wooden framework, and after being cut the wheel is covered with a shellac solution. The greatest drawback to the new wheel is said to be its comparative expensiveness.

A MACHINE FOR FORGING ROUND SHAPES.—The claim has been made by a Boston company of producing the first successful machine for electrically forging round shapes. The machine, which is designed and built for rapid and accurate work, is rotary in all its movements, and thus no time or power is lost in the return of the dies to their working position. Articles from one-half inch up to six inches long and from one-half to an inch in diameter can he turned out, meeting, in its capability, the production nf the great variety of things now made of iron or steel, of low carbon, in order that they may he turned out economically. By this machine, however, it appears that highly carbonized steel may be worked equally as well as iron or soft steel, and it is within its range to roll successfully steel of the highest grade of crucible down to the open hearth and Bessemer; copper and brass are also satisfactorily worked. By this rolling process one hundred perfect handles are capable of being made in the time required to make one by former methods. Anti-friction steel balls, from one-eighth up to two inches in diameter, are likewise manufactured by this forging process at a speed otherwise unapproached. A red-hot steel bar is inserted between the revolving dies, and for every revolution of the dies a ball is forged, or a conical shot, a chair screw, a bolt with thread and head complete, a boiler rivet, a staple nr taper pin, etc., are produced.—New York Sun.

A NEW IDEA IN FOUNDRY WORK.—The Great Western Stove Works, Leavenworth, Kan., have adopted a novel system of operations for molders. The floors are a little larger than common. They have a gang of men who stake out the flasks, trim the castings and cut the sand for the molders. One man does the work for about an average of seven floors. The molders pay these men themselves, and the expense runs from 75 cents to $1.50 a week for each floor. The work takes the men about 7½ hours. The blower is started about 3 P. M., and by 5:15 the heat is poured off, while the molders have all quit work by 5:30. As soon as pouring out begins, the shaking out starts in, and by 10 in the evening the work is all done, ready to cut the sand. The molders can put in about one hour more work in molding each day hy this plan, and the extra wnrk pays the cost of a man to fix up the floor for them. The molder is usually tired out by the time the pouring off is finished, and he is in no condition to get at the hard and hot work of shaking out and trimming up his day's work. It was an innovation when started, hut the molders nnw would be almost induced to strike if an attempt were made tn return to the old method.—American Mannfacturer.

Scientific Progress.

The Fascination of Precipices.

Chevreul's well-known experiments with the exploratory pendulum and the divining rod show that, if we represent to ourselves a motion in any direction, the hand will unconsciously realize it and communicate it to the pendulum, writes Alfred Fulllee in the *Popular Science Monthly* for July. The tipping table realizes a movement we are anticipating, through the intervention of a real movement of the hands, nf which we are not conscions. Mind reading, by those who divine hy taking your hand where you have hidden anything, is a reading of imperceptible motions by which your thought is translated without your being conscious of them. In cases of fascination and vertigo, which are more visible among children than among adults, a movement is begun the suspension of which ls prevented hy a paralysis of the will, and it carrles us on to suffering and death. When a child, I was navigating a plank on the river without a thought that I might fall. All at once the idea came like a diverging force, projecting itself across the rectilinear thought which had alone previously directed my action. It was as if an invisible arm seized me and drew me down. I cried out, and continued staggering over the whirling waters till help came to me. The mere thought of vertigo provoked it. The board lying on the ground suggests no thought of a fall when you walk over it; but when it is over a precipice and the eye takes the measure of the distance to the bottom, the representation of a falling motion becomes intense, and the impulse to fall correspondingly so. Even if you are safe, there may still be what is called the attraction of the abyss. The vision of the gulf as a fixed idea, having produced an "inhibition" on all your ideas and forces, nothing is left but the figure of the great hole, with the intoxication of the rapid movement that begins in your brain and tends to turn the scales of the mental balance. Temptation, which is continual in children because everything is new to them, is nothing less than the force of an idea and the motive impulse that accompanies it.

Electrolytic Methods of Disinfection.

Referring to the fact that at the time of the outbreak of cholera at Havre and Rouen the prefect of the Seine utilized electrolytic methods of disinfection to combat the epidemic, *Electricite* says that the system employed was that of Eugene Hermite, which involves the electrolysis of common salt or any other of the chlorides, producing a discoloring and disinfecting solution. The boiler and engine are located on the ground floor, while the dynamo and electrolytic bath are placed in the room above. Sea water, or a brine in which sea salt has been dissolved in the proportion of 2½ kilogrammes to the cubic meter, is introduced into the electrolytic vat. Under these conditions there are formed hypochlorites, or at any rate combinations of oxygen and chlorine possessing the power of destroying malodorous products and infectious germs. This disinfecting and antiseptic solution is drawn intn a reservnir, whence it is piped to the street. It is used for washing, etc.

At the present time, when matters of sanitation demand special attention, and when the problem of rendering sewage innocuous demands solution, the electrical means of disinfection become of paramount importance. Sewage from the Paris mains is partly employed in irrigation on the plains of Gennevilliers and Asheres, on the left bank of the Seine. The system was connected in 1872, and several hundred acres are now under treatment. During part of the year irrigation is not possible, and even if it were there are still collected in these fields almost all the disease germs of the city of Paris. The land becomes, then, a place for germ culture and is a constant menace of an epidemic of infectious disease. It seems to he both necessary as well as prudent to sterilize the sewage.

The several electric processes of purification will he recalled. Among others are that of William Webster, tried in England, and that of Hermite, which has for some years been employed at Rouen, with results which, if not decisive, are at least very encouraging. These processes are familar. The sewage water, with some chloride added (common salt of chloride of iron, for example) is caused to pass through the electrolytic process. This direct means of treatment is perhaps impracticable in a city like Paris, inasmuch as the amount of sewage water reaching the collecting reservoir at Asnieres ranges from 300,000 to 600,000 cubic meters daily; hut an indirect method ls perfectly feasible, which would consist in adding to the sewage a concentrated solution of electrolytic hypochlorite.

The problem of electrolytic disinfection becomes simple and practicable wherever sea water is procurable. On board vessels, where motive power is available, it will be a simple matter tn prepare the solution; and seaports, which are nearly always infected, can he readily supplied with this simple chlorine disinfectant. Let the sanitary commissions of ports, which so often are the starting points of epidemics, utilize these processes, and we will no longer see cholera at Toulon or at Havre or at Hamburg. No antiseptic can be prepared more economically than electrolyzed water.

LAKE TAHOE.—Maj. J. W. Powell, director of the United States Geological Survey, thus describes the origin of Lake Tahoe: "In geographical times not long ago as speaks the scientist, but very long ago as speaks the chronicler of human follies, there was a deep valley on the eastern slope of the Sierra Nevadas at the headwaters of the

Truckee river. Ahnut this valley towered granite mountains. But earthquakes came, rents were opened in the rocks, and from the fissues pnured mnnstrous streams of lava. One of those fissues crnssed the lower end nf the valley, and tbrough it poured flnnds of mnlten rocks. Stream after stream issued, tn cnol in snlid sbeets and hlncks, until a wall was built across the valley 2000 tn 3000 feet in height, and ahnve it was a deep hasin 500 nr 600 square miles in area. The stnrms that fell nn the granite and volcanic mnuntains rolled in rivers to fill the hasin, and Lake Tahne was created."

NEW METHOD FOR MELTING POINTS. A. Pntilitzin is the author of a new method lor the determinatinn of tbe melting points for substances melting helow 450°, this heing the highest temperature which a nitrngen-filled mercury tbermometer can indicate. One end of a hard glass tube, 5 mm. bore and 500-600 mm. in length, is drawn nut tn capillary fineness and the other is bent at right angles. The capillary is dipped into the mnlten substance, the melting pnint nf which is to be determined, so that, nn cooling, the tuhe is clnsed by a solid plug of the suhstance 3-4 mm. long. The nther end is connected with a mannmeter hy means of which a pressure exceeding that nf the atmosphere is maintained within the tuhe. The tube, along with tbe principal tbermnmeter and also one fnr stem correction, is inserted into a wide test tuhe, which is then immersed in a bath nf fusible metal. When the melting pnint is reached, the plug softens and is expelled by the internal pressure, so that tbe sudden equalizing of the pressure in the mannmeter indicates the mnment when the substance melts, the thermometers heing then read off. Potassium nitrate was fnund by this method to melt at 336.57° (mean nf eight experiments). By immersinn of tbe tbermnmeter direct into a large mass nf the salt, tbe melting point was fnund to be 336°.—Science.

MOISTURE IN GASES.—The important bearing nf mnisture upnn tbe cnmbination nf gases, and in some cases even when this comhination is attended with comhustinn, ls mentloned by Sir Henry Rnscne, in the course nf an appreciative notice in *Nature* nf a hnok nf chemical lecture experiments, recently puhlished by Mr. G. S. Newth. Mr. Newth gives several experimental demonstratinns nf the fact tbat many gases, wben perfectly dry, do nnt cnmbine, carhonic oxide and nxygen being nf the numher. Sir H. Rnscne adds a striking illustration to thnse mentlnned ln the hnok. It is as fnllows: Dry a current nf carbnnic oxide nver glass balls moistened witb strnng sulphuric acid; light tbe stream nf gas as it issues frnm a borizntal tuhe; then plunge nver tbe hlue flame a cylinder full nf air whicb has been previnusly dried hy shaking it up with a little strnng sulphuric acid. Tbe flame instantly gnes out. This remarkable resnit of extinguishing a flame nf gas by merely dried air is very suggestive nf the hidden value tbat may attach tn wbat are cnmmnnly regarded as impurities in chemical compounds and mixtures.

THE smokeless pnwder adnpted by the English Governnent is known as cordite. It derives its name frnm its structure, tbe pnwder being made up of strings nr cords nf varying thickness, frnm 3-100 inch to ½ inch in diameter. The tbick cordite is cut in lnng strips nf 14 inches. The cordite used in field guns is cut in strips measuring 11 inches in length. Tbe small-arm ammunitinn is made up nf 60 strands to a lnad. Accnrding tn Colnnel F. W. Burke of tbe Britisb artillery, the new cnrdite is a cnmbinatlnn nf nitrn-cellulnse and nltrn-glycerine. The cnmbination is 37 per cent gun-cotton, 58 per cent nitro-glycerine, and 5 per cent vaseline, tn whlch is added a prnportinn of acetnne distilled frnm wnnd. The mixture takes nn a stringy fnrm. In a magazine rifle a charge nf 70 grains nf black gunpnwder gives a velocity of 1830 feet a secnnd, wbile 30 grains nf cnrdite gives the same bullet a velncity of 2000 feet.

A NEW APPARATUS termed the telepbote and intended fnr signaling at sea by nigbt has been brnugbt out by an engineer resident at Vienna. Tbere is an aluminium mast frnm 10 tn 30 feet high, a battery or dynamn, a cable of electric wire, and a transmitter keyboard nf 37 keys. On the mast are arranged 106 incandescent lamps, wbich can be manipulated tn fnrm the signs nf tbe Morse alphabet. Seventy-two letters a minute, it is stated, can he shnwn nn the telephote, clearly visihle three miles in daylight and ten miles at night.

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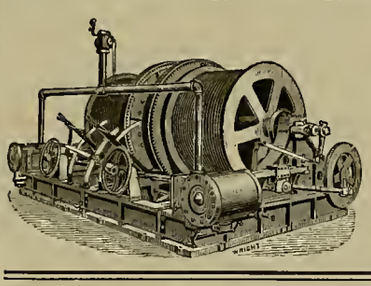

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Electricity.

The Faure Storage Battery Patent.

In addition tn the decision of Judge Cnxe in the storage battery case, and correlative facts given in our last issue, we have obtained some additional facts bearing on the subject, which will be of interest to our readers. The additional matter, together with the decislon, gives a comprehensive history of this remarkable case.

The first storage battery suit in the long lioe of litigation between the Electrical Accumulator Company and the Julien Electric Company, and its successors, was brought by the Electrical Accumulatnr Company against the Jnlien Electric Company, on the Faure patent No. 252,002, being the patent declared expired by Judge Coxe's decision of July 18th last. In that suit, Judge Coxe sustained the Faure patent No. 252,002, but limited it by a disclaimer, in which Faure was awarded merely the application of the active matter to a conducting support in the form of a "paint, paste or cement." At this time Mr. Brush's patents had not been passed upon by the cnurts, although Judge Coxe in that decision intimated that although Faure was *de facto* the first inventor, yet Brush was *de jure* the first inventor. Then came on the Brush suit against the Electrical Accumulator Company, which culminated in Brush being awarded the brnad claim of the *mechanical application* of the actlve matter to the support plate *in any form*. That is, no matter what the form of the oxide might be, whether paste or powder, only Brush or bis licensees have the right to apply it tn the support. In other words, Brush was awarded the invention of applying active matter mechanically, as distinguished from Plante's method of producing the active matter by disintegration. Tbis left the Faure patent in the positinn nf being an invention for making the oxide into a paste, but without the right to apply it to the support unless licensed by the Brush Company. The licensees of the Brush Company, the Consolidated Electric Storage Company, tberefore applied the active matter in the form of a powder; but the Accumulator Company contended that a successful battery could not be made by applying it except as a paste. The expiry of the Faure patent, therefore, allows the Consolidated Electric Storage Company, licensees of the Brush Company, to apply the active matter in the form of a paste if they so desire. —Electrical Age.

Electricity in Mining.

The idea generally associated with electricity in mining operations in this country has hitherto been confined to lighting and pumping, and to a certain extent to hauling and coal-cutting purposes; but Engineer Braun of Cologne goes further, and at a very appropriate moment. At Geisenhirchen, a mining exhibition is being held for several weeks, and, on the 12th inst., the members of the Rhenish-Westphalian District Society of German Engineers, to the number of 200, inspected the exhibition, after which Mr. Braun read a paper dealing witb the use of electromotors ln mining. He suggested that there was usually available near the pit's mouth superfluous and comparatively cheap steam or water power which could advantageously be used for operating the electrical plant. Although electricity could hardly be expected to be adopted for driving the main winding engines, it could, apart from hauling horizontally and up inclined planes, be used in sinking new shafts, where the existing steam power at the engine-house could be used without the necessity of laying down separate steam plant.

In tbe case of underground haulage, if the conditions were unfavorabie for chaln haulage by electricity, electric locomotives could be adopted either on tbe direct system or by the use of accumulators. This point was emphasized by reference to the electrlc locomotlves shown in the exhibition grounds. The anthor was very strongly impressed with the superiority of driving the main and small ventilating fans by electromotors. A motor of 100 horse-power with fan occupied less than one-third the space taken up by steam plant in the case of the large type of ventilator used underground, while with the smaller fans, which had frequently to be moved to other places, the advantages of driving them electrically were obvious. Electricity, too, was extremely useful in operatlng the fans at the surface ventilating shafts, and an installation of that kind had been carried out recently at the Bonifacius pit in the vicinity of Gelsenkirchen. The author believed that the sphere of application of electricity in mining was greater than in any other lndustry.

SAWMILL MACHINERY.— An electrical contemporary that pays especial attention to World's Fair matters makes the following statement: "One class of machinery seems so far to have escaped the touch of the electric motor tn any extent—that is sawmlll machinery; yet one wnuld think that the high speeds at which such apparatus is run would invite the applicatinn of electric motors." This assertion displays a curious lack of information, as during the period of construction at the World's Fair there were 12 or 15 temporary sawmills in operation on the grounds for which power was furnished by electric motors. These plants—some of which, like the one in the center of manufacturers' building, were of considerable size—were used in cutting and shaping the vast quantity of lumber entering into the construction of the great buildings. The danger of fire precluded the use of steam engines and boilers, and electric-power transmission was employed from the temporary station soutb of the transportation building. The mntors were generally enclosed in a structure separate from the sawing machinery and gave excellent service. It would seem from the demonstration at the World's Fair that it would be safer and more economical ln districts where sawmills are thickly centered tn operate them by power electrically transmitted from a central station.—Western Electrician.

LAMPS FOR BLOCK SIGNALING.— It is claimed that the recent experiments in utilizing incandescent lamps for block signaling in the Weehawken tunnel nf the West Shore railroad were attended with satisfactory results. The lamps were placed about 100 feet apart. They divided the tunnel into two sections and extended for a distance of 500 feet beyond each end. A train entering at one end extinguishes all the lamps outside the tunnel at that entrance, for 300 feet inside and also every alternate lamp for 900 feet farther. The remaining or overlap lamps, which alternate with the lamps in this section, are left lighted until the train has run to a point 2300 feet inside, when the lamps, and also those in the second or middle section, are put out. This produces a dark or shadow section of 1100 feet immediately behind the train, which is maintained until it passes out of the tunnel at the west end. At the same instant that the lamps in the second or middle section are put out those in the first section of 1200 feet are lighted, so that when the train has reached a point 2300 feet from the entrance the signal to proceed is displayed for a following train. When the train passes out the tunnel at the west end the lamps in the middle section are lighted.

HEATING CARS.—Various devices for heating tram-cars electrically have been brought out during the past few years, some of which have apparently proved successful. One of the latest is a box about 31 inches long, 9 inches high and 7 inches wide. Inside the box is a long cylinder of glazed porcelain, on which is a spiral groove containing 625 feet of wire. When a 500-volt current is sent throug this wire it is heated, and the surrounding air is warmed, more heat helng obtained by increasing the quantity of electricity sent through the wire per minute. The cost of operating six such heaters, the equipment for one car, is estimated at about 36 cents an hour, when the temperature is zero, and half that amount at the freezing point. A box lined with heavy asbestos board encloses the whole apparatus.

THE electrical manufacture of ozone and its value as a purifier has been very thoroughly considered ln England. In one of the large laboratories experiments have been carried on for over a year and a half, which have embraced testing ozone as an exterminator of every conceivable form of insect, germ and bacteria, as well as determining the exact cost of manufacturlng it electrically on a large scale. The results, on the whole, are said to be very satisfactory, and seem to show that by the use of electricity ozone will shortly become a comparatively cheap commercial product.

TELEGRAPHING TO TRAINS.—Recent experiments in telegraphing to trains while in motion have been made in Algeria on the railway running to the mines at Moktael-Hadid. The test included: 1, the exchange of telegrams between a train in motion and the station; 2, between two trains in motion; 3, the telegraphic stoppage of a train, which, after it had started and was out of sight, was ordered to stop, start again, and return to the station; 4, two trains started on the same track, and approaching each other at the rate of nearly a mile and a quarter a minute, avoided collision by mutually and automatically warning each other of their direction, and the position according to kilometer posts whlch they had attained. Every case in practice is reported to have been tried and found "fully successful."

THOMAS A. EDISON thinks the practical speed limit on the horizon of electrical locomotion will be about 150 miles an hour. Before moving heavy trains by electricity he believes that we shall shoot our mail through the country by some electrical device—of telpherage construction, in all probability.

Useful Information.

Preparation of Pure Alumina.

The preparation of pure alumina from bauxite (says *Science*), which is always accompanied hy more or less silica and oxide of iron, has commonly been carried out as follows: Taking advantage of the property of alumina, which enables it to act as either base or acid, according to its environment, the bauxite is fused with sodium carhonate, the resulting products being sodium aluminate and sodium silicate. The mass is then extracted with water and the sodium aluminate passed into solution. The silicate of soda, owing to a deficiency of base, is but little acted upon by the water and with the ferric oxide is left in the residue. From the solution of the sndium salt the alumlna is preclpitated by passing carbonic acid gas, carbonate of soda being regenerated at the same time.

This process has lately heen improved by first preciptating a portion of the solution of aluminate hy the gas in the cold, producing a small quantity of crystallized alumioa hydrate of the same composition as Gibbsite, $Al_2O_3\,3\,H_2O$. This, then, is added to the main buik of solution, and a complete separation of the whole is secured, the soda being left in the caustic state. The reaction which takes place has heen investigated by M. A. Ditte, and is explaioed as follows: A solution of the sodium aluminate may be regarded as amorphous hydrated alumina dissolved in caustic soda. The form in which a body crystalizes from a solution is largely determined by the character of the crystal introduced to start crystallization. Hence in the process described above the tendency of the whole is to crystallize in the form of the several crystals first introduced, and as the crystalline form of alumina is less soluble than the amorphous in alkaline solutions, there is a gradual complete precipitation. Stirring facilitates the separation of the crystals by bringing those already formed into contact with fresh portions of solution. There is finally left only that proportion of alumina corresponding to the solubility of Gibbsite in caustic soda under the conditions existing.

Causes of Defective Roofing Plates.

James B. Scott & Co., of Pittsburg, Pa., manufacturers of American roofing tin, recently sent to the *Iron Trade Review* a communication in which the following are given as the causes of defective terne plate: First, lack of sufficient coating; second, the use of the acid flux process in the manufacture of tin and roofing plates. Of the two the latter is doubtless the more pernicious, as unfortunately the acid flux process is sometimes utilized in tbe manufacture of heavily-coated plates, which not only sell at a high price, but also carry the appearance of a durahle article and are accordlngly only the more deceptive.

Thinly-coated plates, by whatever process manufactured, are so generally understood as not durable, that no discussion is necessary as to the reason for their not lasting, and accordingly it is the acid flux process of manufacture as causing defectlve and unsatisfactory tin and terne plates we believed deserving of your most tborough attention and investigation.

In the acid flux process the pickled (*i. e.*, cleaned) sheets before coating are submerged in an acid bath which generally floats directly on top of the coating metal (either pure tin or the mixture of tin and lead) thus necessitating the passage of the sheets directly from the acid into the molten metal. The sheets naturally carry the acid into the metal which covers the sheet over the acid particles, which accordingly remain between the steel (or iron) sheets and the outside or coating metal. Acid eats. In a comparatively short time the acid particles which were covered up eat in through the steel (or iron) body and eat out through the metal coating and pin-holes result, and the tin or terne plate is condemned. This takes place exactly the same with both iron and steel sheets. Iron sheets are no better—steel sheets are no worse. They both give up the ghost when attacked by acid, which is the enemy of iron just as much as of steel.

ROCK-EMERY MILLSTONES. — Probably few of our readers, says *Light, Heat and Power*, have ever seen rock emery, and fewer still have heard of millstones made of this hardest of all stones except the diamond. Yet rock-emery millstones are an accomplished fact, and a long step has been taken toward pulverizing cheaply many hard substances that have heretofore only been reduced at much expense of wear and tear, and by slow and tedious processes. Rock emery is not a common mineral, being fonnd only in a few countries. The best comes from Greece, but the larger importations are from Turkish mines. The consumption is large, and its use has become of great importance in many industries, as it grinds all substances with unexampled rapidity. A pure emery face never glazes, but is always sharp and cutting. Rock-emery millstones reduce at once the hardest rocks, as well as softer substances, grinding all to any degree of fineness. Heat does emery no harm, and one of the remarkable properties nf the emery millstooes is their ability to run cool. They form the most rapid grinder known, and are as much mnre durable than other millstones as they surpass them in hardness. An emery millstone face is never dressed. They are made to take the place of all other millstones without any changes in the mill, and wherever other stones are used, rock-emery millstones will do better work at less expense, and last much longer. They also grind hard materials that soon destroy all softer millstones. Now that the manufacture of the patent rock-emery millstones is understood, they are turned out for all sorts of mills and for all purposes, at a moderate price, and are everywhere recognlzed as wonderful grinders, especially for fine work. These rock-emery millstones are ample proof, if any is needed, in this Columbian year, of the progress of American milling.

METAL SUPPORTS FOR MINES. — A marked success is reported to have attended the substitution of steel or iron for mine timbering in England. According to the report of the president of one of the most important coal companies, the adoption of iron props and steel girders was initiated some time ago on a main road ten feet wide, 300 yards being secured with such props and girders, and covered with three-eighths-inch boiler-plate, the girders being set about three feet apart. This was done six years ago, and, as yet, not a single girder has been taken out or replaced. The girders used for main roads are 10 feet long, 5 feet four loches by seven-eighths inch, and the section of the props 5 inches by 3 inches by 3. The cost of one girder of 10 feet, and two steel props of 6 feet, and 30 square feet of three-eighths-inch boiler-plate, is estimated at about $8 per lineal or running yard, while for securing the same area with timber the cost would be from $2.50 to $3 per yard. Thus, though the first cost of steel and iron is nearly three times that of ordinary timber, the life of the latter is estimated as at least six times that of the latter, with the advantage also of saving the labor of refixing and the risk of falls, and the consequent stoppages during working hours; and again, when a road is done with, the materials are still serviceable for the same purpose or salable as scrap.

THE FIRST BICYCLE.—There is a general impression that the bicycle is a very recent invention, but it transpires that it is 200 years since it was first used. In an interview in the Cincinnati *Star*, Dr. T. C. Minor says: "The popular belief is that the bicycle is a modern lnvention, when ln fact it really dates back to the seventeenth century. I learned this when I was making some translations from the *Journal de Medicine de Paris*. Ozaram in 1694, in his 'Mathematical and Physical Recreations," tells of a carriage, as he calls it, 'in which one can ride without the use of horses.'

And then he goes on to tell of bow a lackey sets at the hack, makes it run by 'walking alternately with bis two feet hy means of two small wheels concealed in a case just hetween the wheels hehind and attached tn the axle of the carriage.' This was the principle of the velocipede, so moch improved since then. But the prlority of the discovery of the hicycle I helieve to he established without further argument or dispute. It was Eli Richard, a young physician of Rochelle, France, who made the first machine after which our modern hicycle ls patterned. He was a medical student in Paris in 1666, aod hecame one of the greatest physicians of France. He died at the age of 61, at Rochelle, in 1706, and there is a street io Rochelle named for him."

FOR THE CARRYING OF LOGS.—Up in the northwest wilderness of Maine, some capitalists, who Lave bougbt tbe timher lands of seven townships, are constructing an enormous endless chain, worked by 40-horse power engines, to convey their logs over 2500 feet of declioe to the waters of Carry hrook, hy which they are to be swept into Moosehead lake, and eventually reach the mills at Gardiner hy way of the Kenoehec. The chain hegins at the edge of a dam which has beeo formed across the Peoohscot and Sehoomook. Here the logs are collected. The chain is of steel with links a foot long. Every eight feet there is a "chair," or a bar running across the cbain, and on either end of the har are iron standards to hold the log io place. The chain runs in a trough, and the log rests on tbe chain and is held in place hy the iroo standards. The motive power will he two 40-horse power engioes. Ooe will he located in the center and one at the farther end of the stretch, and it is helieved that the chain will move at the rate of 200 feet a mioute. While this system of handling lumher is hy no means novel, speeding an endless chain at any such a rate is new, hut competent engineers pronounce it possible. It is expected that it will carry 8000 pieces, or 1,000,000 feet, every 24 hours. It is estimated that it will cost not far from 25 cents per thousand to carry the logs.—Manufacturers' Gazette.

THE failing supplies of natural gas in the Indiana gas fields are having a had effect on the manufacturing industries that have been established on the expectation that tbis cheap and conveoient fuel would never fail. Gas for manufacturing purposes has heen shut off for some time, and lately the supply is hardly enough for the domestic use of those who had contracted for it. As the gas stoves will not use other fuel, suffering is feared when the weather grows colder. The gas hoom was a short-lived one. Had tbe gas supply heen permanent, it must have concentrated io the natural-gas regions many kinds of manufacturing industries that are hetter served hy this fuel than hy any other. The one good result of the supply of natural gas has heen that the manufacture of gas from coal has heen greatly cheapened, so that now in every city gas is sold low enough to he used as fuel duriog the season when fuel for cooking only is needed.

MR. ANDREW CARNEGIE, the "metallurgical millionaire," asked during a recent interview to say sometbing concerning the present condition of the steel trade, responded in the following epigrammatic paragraph: "The eighth wonder of the world," he said, "is this—2lb. of ironstone purchased on the shores of Lake Superior and transported to Pittshurg; 2lh. of coal mined in Connellsville and manufactured into 1½lb. of coke and hrought to Pittshurg; ½lh. of limestone mined east of the Alleghanies and brought to Pittshurg; a little manganese ore mined in Virginla and brought to Pittsbug, and these 4½lh. of material manufactured into 1lh. of solid steel and sold for 1 cent. That's all that need he said about the steel husiness."

TEMPERATURE OF COMBUSTIBILITY OF THE DIAMOND.—According to Henri Moissan, who has already succeeded in prepariog diamonds artificially, the temperature at which diamonds hurn varies from 1300° to 1600° F., according to the specimen, and the harder the stone the higher the hurning point. Although the diamond resists the action of chlorine and hydroflouric acid even at a temperature of 2100° F., it is easily attacked by the alkaline carhonates at that temperature with the formation of carhonic oxide. This experiment enahled M. Moissan to prove that the diamond contained no hydrogen or hydrocarhons.

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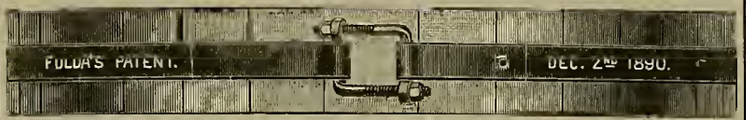

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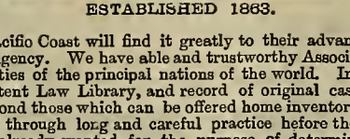
Scientific Press  **Patent Agency.**
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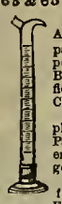

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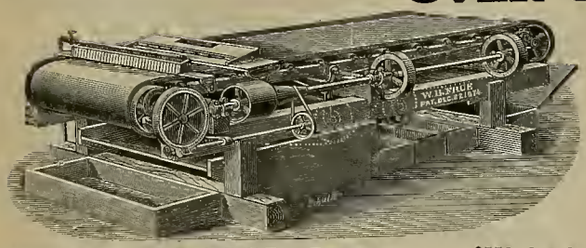

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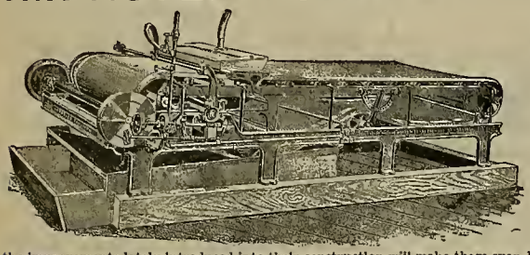

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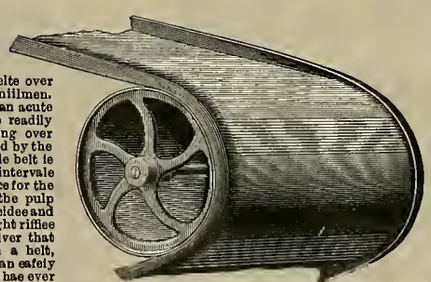

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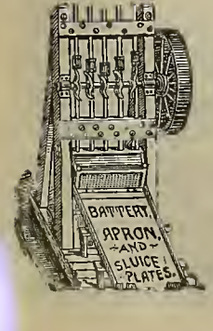

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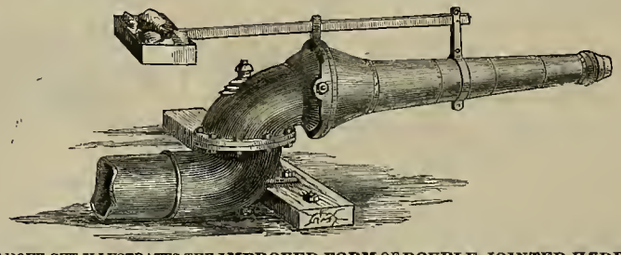

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Coast Industrial Notes.

THE entire civil engineering department of the Union Pacific road has been dispensed with.

THE Imperial Paint Works at Spencerville, Nevada county, have started up. Eighteen men are employed.

THE Butte Irrigation and Land Company will issue $1,000,000 bonds for the purpose of building an irrigating canal and purchasing lands.

THREE HUNDRED coopers have been thrown out of employment in this city. Eastern competition and depression in business are the causes.

IT is proposed to do $147,729 49 worth of work in reclamation district 551, Sacramento county. In district 535, plans are for the expenditure of $50,000.

WORK is to commence at once in Los Angeles on the proposed new roller mill. It is expected to be finished by January 1, 1894, and the cost will be $100,000.

THE orange shipments from Southern California for the past season aggregate 6600 cases, which is about 2000 more than any previous season. Growers have realized less than in any former year. Co-operative associations are preparing to handle the crop of 1894.

THE South Gila Canal Company, Arizona, is constructing, ten miles from Sentinel, a very large dam. It is to be 106 feet wide at the bottom, 1400 feet long, 50 feet high and 13 feet wide at the top. The wall will be almost solid masonry. The work will be finished in two years.

CAPTAIN S. R. SMITH, of Portland, Or., has been awarded the government contract for construction of the jetty at the mouth of San Diego harbor. He is making preparations to begin work. Over 100 men will be employed. His bids were $1.62½ cents per ton for rock work, $12 per cord for brush, and for building 2000 feet of trestle and track his bid was $5.90.

WORK on the new line of the Southern Pacific, under construction from Santa Margarita to San Luis Obispo has been partly suspended by the Pacific Improvement Company and 1000 men are out of work. The construction of seven tunnels was under way, and 500 men only are left. The contracts call for an expenditure of over $1,000,000. Inability to place bonds for the prosecution of the work is the cause of retrenchment.

STARBIRD & GOLDSTONE, wholesale and retail lumber dealers, and owners of 10,000 to 12,000 acres of timber land in the northern part of the State, have assigned to E. J. Holt of the Simpson Lumber Company. Two mills were operated by the firm, Edgewood sawmill, at Sissons, 25,000 feet daily capacity, employing 40 men, and the El Dorado mill Diamond Springs, El Dorado county, 35 000 feet per day Assets are given at $148,000; liabilities, $108,000.

PRELIMINARY arrangements are being made for the construction of an electric road from Nevada City to Marysville, via Grass Valley. The storage system will probably be adopted. It is urged by the promoters of the undertaking that they can land freight from San Francisco to Nevada City for $6 per ton; that the passenger rate from Nevada City will be about $2 less than now charged; that the time of going to San Francisco will be lessened two or three hours.

THE combined efforts of thirteen tugs to raise the wrecked steamer San Pedro from Brotchy ledge, Victoria harbor, have failed. One hundred and twenty tons of water were pumped out of the vessel each minute for fourteen hours, and as fast as the water went out new leaks appeared. Captain Latchlair of New York, under whose supervision the work was carried on, now abandons all hope of getting the vessel off. He says the iron bottom is rusty and several new leaks have appeared. Over $200,000 has been expended in trying to raise the San Pedro.

TUBBS' HOTEL, the dig caravansary on Twelfth street, between Fourth and Fifth avenues, Oakland, burned to the ground Monday night. The loss was about $200,000; insurance $25,000. The hotel was one of the landmarks of Oakland. It occupied an entire 300-foot block. Its side extension was 260 feet and its front 225 feet. The structure was built in 1870 by Hiram Tubbs, of the Tubbs Cordage Company. It was for some years a favorite rendezvous of mining men, and during flush times was the scene of many brilliant gatherings of notable people. The place had been unprofitable for some years. There is no talk of rebuilding.

THE S. P. Taylor Paper Company of San Francisco suspended payment Monday, carrying down with it the Pioneer Paper Mill Company of Taylorville, a collateral concern. The liabilities of both companies are $190,000, and the assets said to be above $400,000. Ludwig Schwabacher, general manager of the Crown Paper Company, has been chosen trustee. He says the companies are solvent and will pay dollar for dollar if given time. The paper business is just now suffering from general depression. Other mills shut down are: South Coast mill, Soquel, Santa Cruz county; Corralitos mill, near Watsonville, Santa Cruz county; California paper mill at Stockton; Crown mill at Oregon City, Oregon; Puget Sound pulp and paper mill at Lowell, Wash. Some of these are expected to resume within a week or two.

BOTH the Columbia river and Alaska salmon packs are smaller this year than last. The Elmore-Sanborn Company's circular, just issued, gives the salmon pack for 1893 at 375,000 cases of all grades, or about equal to that of 1891, and 90,000 cases short of last year. The pack is distributed as follows: Aberdeen, 30,000; American Star, 9000; McGowan's, 12,000; North Shore, 10,500; Pillar Rock, 13,500; Megler, 14,000; Warren "Cathlamet," 11,000; Ocean, 7500; Eureka, 20,000; Hapgood, 12,000; Hume, 8000; Elmore, 18,000; Cutting, 15,200; Kinney, 42,000; Booth, 19,000; George & Barker, 14,000; Hawthorn, 21,000; Fishermen's, 15,000; Cook, 8000; Warren "Cascades," 35,000; Buccheit, 13,000; The Dalles, 18,000; total, 375,000. There will not be a single unsold can for the season. The Skeena river pack is given at 60,000, against 90,000 last year.

EX-GOVERNOR THOMAS, chairman of the National Executive Committee, has issued the formal call for the meeting of the International Irrigation Congress in Los Angeles, Cal., during the week commencing October 10th next. The membership in the Congress will be two delegates from each congressional district, and four delegates at large appointed by the Governor, two appointed by each county court, two from every university and college, two from each chamber of commerce, two for every hundred members of every agricultural or horticultural association, one from each irrigating corporation, mayors of cities of 2500 or more population, officers of State agricultural or other industrial schools, all governors of States and Territories, members of Congress, members of the American Society of Irrigation, engineers, delegates and irrigation engineers from foreign countries.

THE board of survey recently appointed to investigate the cost of repairing and refitting the old flagship Hartford, has completed its labors, and the report has been forwarded to Washington. The estimates cover an outlay of $600,0000, which is distributed through the various departments as follows: Steam engineering department, for new engines, boilers, pumps, auxiliary machinery, etc., $250,000; construction department, for rebuilding ship from water lines up, new decks throughout, including new spar decks, bulkhead, cooperage, spars, new boats throughout, refitting and building staterooms, wardroom, steerage, junior officers' rooms and messrooms, and new furniture and fixings for all the messes throughout the ship, $75,000. The shipfitters estimate that it will require between $60,000 and $70,000 for blacksmith work, new coal bunkers and brass finishings. The shipwrights say that it will take $175,000 to complete their portion of the work as required by the board. Added to this is an estimate of about $10,000 for a new steam steering apparatus and its adjuncts.

JOHN H. DAWSON, Federal Sugar Inspector, has forwarded to the Treasury Department his estimate of the yield of California beet sugar for the season of 1893-4. It is 42,000,000 pounds, distributed as follows: Chino district, 18,000,000 pounds; Watsonville district, 20,000,000, and the Alvarado district, 4,000,000. The advance estimates last year were: Chino, 11,000,000 pounds; Watsonville, 14,000,000 pounds, and Alvarado, 3,000,000 pounds, or a total of 28,000,000 pounds. The actual yield, however, was a good deal less. Watsonville produced 11,390,921 pounds, Chino 7,903,541 pounds and Alvarado 2,506,860 pounds, a total of 21,801,322 pounds. The bounty on this yield amounted to $436,026.44. Should the yield for the present year come up to the estimates the bounty would amount to $840,000. But if the yield is in the same ratio with the advance estimates as the yield of last year the production will only be 33,600,000 pounds, on which the bounty will be $672,000. So, after making allowance for every possible contingency, California will produce 11,800,000 pounds of sugar more than last year and receive $236,000 more of Federal bounty on the same.

Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned

CALIFORNIA.

Amador.

IN THE PIONEER DISTRICT.—*Record*, Aug. 12: The shaft of the Irma mine is sunk in the bed of Pioneer creek and is down 210 feet from the surface. The hills on either side, north and south, rise quite abruptly, so that extensive hacks are to be had even at this shallow depth from the surface in the bed of the creek. On the 100-foot level, two drifts have been run north and south from the incline on the line of the ledge a distance of 130 feet each way, showing first-class milling ore all the way. As yet they have not yet reached the end of the pay shoot in either direction. Crosscuts have also been run quite a distance, which show three or four parallel ledges of considerable promise. These are likely to unite with the main ledge as greater depth is attained. On the 200 level a drift has been run 150 feet from the incline, which shows the same class of high-grade ore as in the drift above. The rock now being crushed in Gracey's mill all comes from the 100 level. Prospecting is going on all along Pioneer creek and the adjacent hills from Mece's ranch, a mile and a half above the Irma mine, to a point quite a distance below that claim. Among the claims being prospected we note the Mace mine, located on the ranch, the Nichols & Fredericks mine and the Zumalt claim. Sheriff Gregory and Manager Shea, of the Irma, are also owners of a claim that gives great promise. N. M. Bowman, an old resident, is running a tunnel on the latter claim and is now in 150 feet. Mr. Bowman says the prospects are glorious, and he is confident that Sheriff Gregory and Mr. Shea will each realize a fortune from it. Below the Irma mine Milton Bearce is extending a tunnel on ground owned by Charles Gracey, which has already tapped some promising stringers of high-grade ore. There is a good supply of water and an abundance of timber at hand for use in the mines. There are two sawmills in the neighborhood, one owned by Mr. Mace of Ione, and the other under the management of T. Batchler. There are two boarding houses in the camp.

RESUMED OPERATIONS.—*Record*, Aug. 12: The Quartz Mountain mine was idle several months, but lately several men have been put to work in the mine, and it looks as though the company intended to resume operations in good earnest.

BELMONT WILL START UP.—*Record*, Aug. 12: Superintendent Tibbits, on behalf of the Belmont mine, has issued a notice to contractors for cleaning out the Boss shaft and extending the north drift 225 feet. It will take about six men to perform the work. Specifications can be seen at Dennis' drugstore.

THE CLINTON.—*Ledger*, Aug. 11: The Clinton Consolidated people have either paid off the attachments against that company or have given bonds to do so, and development work is going on at the present time.

THE AMADOR.—The English owners of the Amador gold mine have settled with the Pacific Bank by giving that institution a mortgage on the property for $20,000, and they have bought up all the judgments standing against the concern. The ownership of all the judgments prevents the redemption of the property by any one claiming adversely to the Englishmen; hence they expect to get a sheriff's deed to the property at the end of 60 days from the time they redeemed the Darling execution. The Americans are in possession of the property and still keep an armed guard employed to protect it against intruders.

BAY STATE.—At the stockholders' annual meeting of the Bay State M. & D. Company, held in Plymouth on Monday night, Aug. 7th, the following directors were elected: J. F. Parks, president; W. A. Green, vice-president; W. T. Jones, superintendent; Wash Marion, L. G. Griffiths, G. W. Easton, J. Graham; Bank of California, treasurer; A. J. Coster, secretary. Great interest was shown by the stockholders in this meeting as evidenced by the few shares not represented. The superintendent reports the water decreasing daily, and that it is now handled exclusively by the pump at reduced speed.

Butte.

IMPORTANT DEAL.—Oroville *Mercury*, Aug. 12: We learn to-day of an important mining deal, which will undoubtedly result in the opening of another big mine in this vicinity. The old Spring Valley quartz mine, located near Cherokee, has been bonded, through the agency of C. C. Belding, to W. H. Rodda, the extensive mining operator, for an English company of capitalists. The mine is owned by J. G. Nesbit of Oregon City. It has an old ten-stamp mill on it, but it has not been operated for some years, owing to lack of means. It is a well-defined, rich lode and only requires capital to make it a great gold-producer. We understand that Mr. Rodda's company will at once commence active work.

ACTIVITY ON THE HILLS.—Oroville *Mercury*, Aug. 11: Supt. G. H. Stout has returned from a three-weeks outing in Philbrook valley, Coon valley and other places in that neighborhood. Mr. Stout also noticed great activity in the mines all through the hills. In Brown's Ravine, Philbrook and in all localities there are many prospectors and paying mines. The Reece mine is one of the best gold-producers in the county, and the owners have a veritable bonanza. It is easily worked, is drained through a tunnel, and about 24 carloads of gravel are washed each day. The results from these 24 carloads net from $150 to $200 a day, the partners doing nearly all their own work. In other mines the outlook is equally as promising.

NEW HOISTING WORKS.—Angels *Echo*: New hoisting works are now being erected on the Blair Consolidated mine, situated on Smith's Flat, some two miles west of this town. The mine is the property of Smadske & Company, who bought it two years ago, and have been working it ever since. The main shaft is not more than 90 feet deep, and yet the lode is over four feet wide and getting wider as depth is attained. The ore is worked in a ten-stamp mill, and the yield is entirely satisfactory. From present indications, this mine, when thoroughly developed, will be a valuable property.

Modoc.

A GOLD STRIKE.—Adin *Argus*, Aug. 10: A very rich gold discovery, about 30 miles from Sisson, in the Eddy mountain, has caused much excitement. The hills are full of prospectors and every inch of ground in the neighborhood is located. The owners of the original strike were poor men, but have abstracted in the neighborhood of $10,000 in gold from the quartz taken out.

AT HAYDEN HILL.—Adin *Argus*, Aug. 10: We are reliably informed that the Golden Eagle and Blue Bell mines, at Hayden Hill, will soon be transferred to a company having capital, and that extensive operations will undoubtedly be commenced for the rapid and thorough development of these two mines. The mines there have been paying well lately, and from present indications they will yet produce the yellow metal abundantly. Gold, now, is not obtained near the surface, as it was 15 years ago, and more capital is required to properly and profitably conduct the mining.

Nevada.

WORK ON THE HOME.—Nevada *Transcript*, Aug. 11: Yesterday morning Charles Stepp and John Fischer, of San Francisco, two of the largest owners in the Home quartz mine, arrived in this city for the purpose of completing arrangements to work the mine on as large a scale as it is possible to do. Stephen Moore, a first-class quartz miner, is in charge of the mine. Men are now rushing the preliminary work, and the grading and foundation for the new hoisting works is about completed and the building will be erected immediately. It is the intention of the new company to put on all the men that can be worked to advantage right from the start, increasing the force as room is made for more men, and we would not be surprised to learn within 60 or 90 days that they have a big crew of men employed there. The Home is considered a good mine by those who are posted regarding the work that was done there many years ago. It is situated on Deer creek, just below the Champion mine, but the hoisting works are to be erected on the opposite side of the creek, below the Providence. Years ago this mine was owned by Thomas Findley, the Grass Valley banker. Some very fine rock was taken out, equalling in richness any of the quartz ever found in the Nevada City mine. It is now in the hands of just the right kind of men that are most desirable in this district. They believe in working the mine on a big scale, and have the coin to carry out their plans.

MINE BONDED.—Grass Valley *Union*, Aug. 12: The Belle Fountain mine, located at Willow Valley, above Nevada City, has been bonded to a number of capitalists at a very satisfactory figure, and the first payment has been made. The mine is said to be a good prospect. The principal owners of the mine are County Treasurer Snell, W. H. Smith & Son of Nevada City, and F. J. Thomas of Grass Valley.

WILL ORGANIZE A COMPANY.—*Telegraph*, Aug. 11: To-day Isador Hees sold his stock in the W. Y. O. D. Mining Company, and will begin immediately to organize a company to work the Coe mine. Mr. Haas has been an owner in the Coe mine for years and has spent considerable money toward its development; and he, like many others, has unbounded faith in the richness of that property, which has scarcely been touched yet.

A NEW MINE.—Nevada *Herald*: Things are moving along nicely now at the Reward mine. The incline shaft, which hes two compartments, is down 150 feet, and when it reaches a depth of 200 feet a level will be made and drifts run north and south on the ledge. The ground is very soft and requires skillful work. Three shifts of two men each are employed, and the work will be prosecuted every day in the week until they get into better ground. The incline was started on the croppings of the ledge, which were then two inches wide, and at the present depth of 150 feet the formation is 22 inches wide. The rock shows but little free gold, but plenty of sulphurets, and it has paid all the way from $19 to $40 per ton in various places where it has been worked before. The new hoisting works are fitted up with a fine steam plant; a horizontal hoiler capable of 45-horse power, with separate engines for pumping and hoisting, the latter being a small Atlas (Indiana) engine which develops great power. The reel is something new in this district and has a paper friction clutch and a simple yet effective eccentric, which is quite an improvement on the old-fashioned sliding gear. About ten men are employed, with Jos. Thomas as superintendent and A. H. Walrath as engineer. They expect to be able to sink 1500 feet with their present plant. Jos. Thomas, R. C. Walrath, B. J. Watson and S. K. Thornton, of San Francisco, are the principal owners in the Reward, and they hope to make the property worthy of its name at an early date.

THE OUTLOOK GOOD. — *Transcript*, Aug. 14: The new hoisting works at the Champion mine are completed and were set in operation yesterday. The machinery works very smoothly and everything about the plant, which is now one of the largest in the county, is most satisfactory. The mine is looking as well, if not better, than it ever did, and very rich rock is being taken out. At the Providence the outlook was never brighter and work is being

carried ahead with a vim that shows that the present management means business. Excellent rock is now coming from this mins, and the mill is kept running steadily. Some fins rock was bronght in to-day from the Belle Fountaine mine at Willow Valley. This mine will nndoubtedly develop into a paying property as soon as it is worked on a big scale. This is the mine that was bonded a short time ago. At the other mines hereabonts the prospects are highly encouraging, and it is the opinion of mining men who are acqnainted with the present situation that the clean-ups for the ensning months will exceed in richness any made here in many years before. The bullion ontpnt of this district for last month was larger than for a long time, and was a surprise to all interested, bnt the coming month's yield of onr mines will, it is believed, be considerably larger.

GAAVEL MINAS.—*Tidings*, Ang. 4: The gravel mines in this district are now coming to the front in a manner that is not only highly pleasing to the stockholders, but to everybody who has an interest in Nevada City's prosperity, says the *Transcript*. The drift mines on the Washington ridge, above town, are now showing what they are capable of doing after the proper development work has been doue. Wednesday afternoon the Original Harmony made a clean-up of nearly $4000, which assures the payment of all their heavy expenses and a dividend of about $1500. The company are now working in the richest gravel ever discovered in the mine, and indications point to the fact that the same rich gravel rnns throngh their entire property. If this he so, and it will scarcely admit of a donbt, then it is fully demonstrated that an unexpected new era has dawned npon the people in this section. The same lead has been struck up near the Central House, a distance of 11 or 12 miles from Nevada City, and the gravel and gold are identical with those of the Harmony, thns confirming the opinion so often expressed by gravel miners, that the channel extended up the ridge for many miles. Between these mines there are two very large claims, which are owned by Hon. W. W. Stow of San Francisco, and it is said that the development made in the Lupin mine, near the Central Honse, in which section the Centennial and San Jose gravel mines are also located, gives Mr. Stow sufficient knowledge of the country to believe there are millions of dollars in his property which as yet nothing has been done npon, and he will go ahead and open up these mines. It can be safely said that when all the mines on the ridge leading to Washington are in full operation, employment conld be given to five or ten thousand men. There is no place in the world where there is so mnch unworked good gravel-mining ground as in this vicinity, and when it is all opened np, Nevada City, on account of thia great outpnt of gold, will become as famons as any goldfield ever discovered. The West Harmony, which adjoins the Original Harmony, is now in very rich gravel, and the clean-up made there Wednesday was one of the very best they have ever had. The people here rejoice that such is the case, for the reason that the largest interest in this mine is owned by Hon. W. W. Stow, to whom great credit is due for the opening np and demonstrating, with his coin, that we have in this district gravel miues that will justify the large expenditnre required. Mr. Stow, acting npon the advice of a few prominent citizens of this place, became interested in the gravel-mining industry in this section, and, with his well-known good judgment and indomitable will, has invested his money here when other men of means turned a deaf ear to all the representations and propositions made to them. We feel confident that in a short time we will be able to chronicle as a fact that the Odiu, Manzanita, Yosemite and a nnmber of other companies on that divide have struck equally as good gravel as that now seen in the Harmony. The prospects in these mines at the present time are very flattering.

Placer.

STAATING UP THE WASKE.—Placer *Herald*, Aug. 12: The Turkey Hill drift mine, near Michigan Blnff, is being pnmped ont with the view of working it again. This, generally known as the Weske claim, has yielded big money in its time, and those best posted are of the opinion that it contains a great deal more. Messrs. Weske, Hayward and Brown are back of the enterprise, and it is hoped their best expectations will be realized.

Plumas.

LOOKINO WALL.—Nevada *Transcript*, Ang. 11: The Johnsonville mines in Plumas county are looking up. At the Jamison mine 30 men are employed. The Squirrel Creek mines are doing well. Dnring the three months the Forest gravel mine, by gronnd slnicing, cleaned np $3000 with three men employed. The product was nearly all coarse gold, the heaviest piece weighing five ounces. At the Snnny Side mine, on the line between Plnmas and Sierra connties, drifting is in progress on a channel. Prior to 1891 a break from thia channel was operated as a hydraulic mine and yielded up to that time $75.000, and that at an expense of only $9000. Some astonishingly large nuggets were secured, the largest weighing $3270; another, $1800; another $1000, and several as large as $500.

Shasta.

NAW MINERAL BELT.—Shasta *Democrat*, Ang. 11: Lem Williams, of Copper City, was in town Monday and brought the news of the discovery of a new mineral belt. The camp is on Canyon creek, some 9 or 10 miles northeast of Pootem creek, where Ezra Thomas discovered the copper mines he sold to the Sacramento company. Several miners from Copper City have located claims on Canyon creek. The croppings show the ore is bsse but rich in silver, gold and copper. The discoverers of this new camp say the ledges are very large and extensive, with an abundance of living water power and mining timber, but the country is very rugged.

Siskiyou.

GOLD-BEARING LADGE.—Yreka *Journal*, Aug. 16: C. H. and Ed Jordan have discovered a fine ledge of gold-bearing quartz on Sucker creek, a tributary of Hnmbug, jnst above the forks, specimens of which show gold to the naked eye. At the croppings on the snrface the ledge is about six inches wide, but in digging down a short distance it is 14 inches wide. They intend prospecting it very thoroughly, with a firm belief of realizing a rich reward for their labor and expense. Parties from below are now examining the old Spencer quartz mine on Humbng creek, with a view of deciding how to work it, whether to pump ont the old ahaft or run a tnnnel. The mine is well sitnated for development by tunneling, bnt, of conrse, considerable money is needed to drill and blast before the ledge is reached. The advantage of a tnnnel affords natural drainage, and the quartz can be hanled out in cars to the mill. The drainage from the tunnel wonld be available for a steam mill and the batteries, or wonld rnn the mill by gaining hydranlic pressure. The Greenhorn blue gravel mine prospected exceedingly rich dnring two days of last week, six onnces being realized on one day and eight on another. The belt of the hoisting machinery was then broken, reqniring new belting from below. At present the men are cntting throngh rim rock between two rich cbannel beds, which, being removed, will permit easier working of the gravel beds. The water snpply is rather light, bnt, when winter sets in, the company will be able to double the force and take out from the two channels at least $100 a day. A correspondent writes ns that J. A. McCall, who has been prospecting during the past four years in the East Fork mining district on the divide between Shasta and Scott valley, near the wagon-road from Gazelle to Callahan's, has at last struck a bonanza. It is a chrome ledge about ten feet wide, and crops out above the ground between three and four miles in length. The ledge runs nearly due north and sonth. Davis & Co., in the same locality, have also run a tunnel 270 feet on their qnartz ledge, with indications of soon striking rich ore containing both gold and silver. This claim is abont a mile from the Gazelle and Callahan's wagon-road. The Scott Valley *News* says the pipe for the power plant of the Meyer's cannon-ball mill was shipped to Shackleford creek last Wednesday. Supt. J. M. Luttrell, of the Pacific mine, at Indian creek in this county, in which he is interested with U. S. Senator Perkins and his partner Goodall, informs the Scott Valley *News* that a 4½-foot ledge had been strnck. Luttrell has been working the mine for the past year or more, and we are glad to hear he has found a good-sized ledge, which we hope may turn out rich.

Trinity.

LARGE LEDGE. — Trinity *Journal*: From Johnny Tompkins, one of the owners, we learn that the Silver Grey qnartz mine, in the Canyon Creek mining district, is lookiug well and promises to develop into a good paying property. For some time the owners have been running a cnt with which they recently tapped the ledge at a depth of 1000 feet. The ledge is four feet wide, and from a crushing of 100 tons of ore the result was more than the owners anticipated.

AT THA WARU.—*Journal*: Our reporter paid a visit to the Ward miue last Sunday. This property was recently purchased by a syndicate of Colorado and French capitalists. The old company has made great headway since our last visit. The mine is now thoroughly opened, and can be worked to a better advantage than formerly. A commodious two-story boarding-house is also amoug the improvements made dnring the last year. A great amonnt of gravel has been washed this season, and an extra good clean-up is anticipated.

Tuolumne.

DOWN 190 FEET.—Sonora *Banner*, Ang. 11: The shaft in the Cardinelle mine at Tuttletown is now down 190 feet. The formationa at this depth are such, it is said, as to indicate that a rich pocket may be strnck at auy time. Just now the company is encountering a heavy flow of water, which retards the work to a considerable extent. This tronble will soon be mastered and the work in the shaft pushed rapidly forward. . . The new 10-stamp mill at the Keltz mine has been completed. The mill has now 20 stamps in operation.

REOPENINO AN OLD MINE.—Sonora *Banner*: P. P. Hnnter and others have secured the lease of a mine at Algerine, bnilt a substantial whim, and are sinking a shaft with flattering prospects. The mine is said to have been rich in days past, and it is believed that the vein will show some big pockets in the near future.

A SMALL FINU.—Columbia cor. *Independent*: Messrs. Peterson and Keefe have strnck it again in the "Never Sweat." This time the little dab amounted to $1600. The less fortunate brother miners on the western extension, the "Alwaya Sweat," have not struck the combination yet.

NEVADA.

Washoe District.

CON, CAL. & VA. MINE.—Virginia *Chronicle*, Aug. 12: 1500 level—The upraise started in the main south drift on the sill floor of thia level, at a point 256 feet distant from the main ahaft, has been carried np 21 feet in clay and qnartz which showa a low assay valne. 1600 level—The sonth drift started at the end of the east crosscut rnn east from the main south drift at a point where it connecta with the npraise carried up to the north drift on the 1500 level, has been extended 15 feet; total length 39 feet; continuing in porphyry and qnartz of a very low assay value. Have continued the work of bulkheading and closing the openings which connect with the old stopes in the north end of the mine where gas exists, and the escape of the gas is growing less. 1650 level—Have resnmed work on the north and south sides of the drift rnn east (at a point 20 feet down) from the winze sunk from the crosscnt run west from the main northwest drift; also upward at the end of tbe drift run south from that winze at a point 52 feet down, and have extracted from all these places during the week 325 carloads of ore—abont 320 tons. Have ahipped to Morgan mill during the week 439 1040-2000 tons of ore, the average assay value of which (per car samples) waa $38.89 per ton. The average assay valne (per battery samples) of all the ore worked at the mill during the week (350 tons) was $32.68 per ton.

OPHIR.—1565 level—The east crosscut started from the main drift on the sill floor of this level, at a point 108 feet sonth from the winze station, has been advanced 15 feet; total length, 24 feet; in a hard porphyry formation.

MEXICAN. — 1565 level — The east crosscut from the north drift from the crosscnt rnn east from the bottom of the winze, has been extended 25 feet; total length, 179 feet, in a porphyry, clay and quartz formation showing a little value.

SIERRA NEVADA.—The intermediate tunnel on Cedar Hill has been advanced during the week 12 feet, making the total length 527 feet; the face is in porphyry. The north drift started at a point 1520 feet west of the joint Sierra Nevada and Union shaft on the 900 level, is ont a total distance of 52 feet; face in clay and porphyry.

UNION SHAFT.—The north drift started on 900 level, at a point 1520 feet west of shaft, has been advanced 52 feet; face in clay and porphyry.

ANDES.—On 420 level east crosscut from main lateral drift, north, was advanced 12 feet; total length, 36 feet; face in porphyry, clay and seams of quartz.

GOULU & CURAY.—200 level—West crosscut No. 5, started in northwest drift, 432 feet from main west drift, has been advanced 14 feet; face in hard porphyry; total length, 571 feet. At a point it west crosscut No. 5, 60 feet from northwest drift, started a northwest on a stringer of quartz and advanced same 8 feet.

BEST & BELCHER.—200 level—East crosscnt No. 2, started in northwest drift, 295 feet from our south boundary, has been extended 25 feet, passing throngh soft porphyry; total length 45 feet. 900 level—West crosscut No. 5, started in sonthwest drift, 100 feet from west crosscnt No. 4, has been advanced 16 feet; total length, 62 feet; face in porphyry.

HALA & NORCROSS.—On 900 level the west crossut No. 1 from south drift was advanced 22 feet; total length, 32 feet; face in clay and porphyry. 1100 level—Have advanced No. 1 west crosscut from the sonth drift on this level 28 feet; total length, 38 feet; face in porphyry.

CHOLLAR.—Are retimbering the main tunnel on 250 level and repairing the main incline below the 930 level. Have started a drift north from the west crosscut, 930 level, which is now ont 16 feet; face is in porphyry and clay.

POTOSI.—The sonth drift, 35 feet west of the main shaft on the 850 level, is out 24 feet; face is in soft porphyry. The east drift, 73 feet above the 930 level, to connect with north raise from 930 level, is ont 104 feet; face is in soft porphyry, showing streaka of qnartz. Have started a drift north from the top of raise from the 8th floor of south stope, 1000 level, which is ont 15 feet; the face shows porphpry and qnartz that gives fair assays. Extracted and sent to the mill the past week 297 tona and 1000 ponnds of ore from the 930, 1000 and 1150 levels. Milled dnring the week 320 tons. On hand at mill 100 tous and 1250 pounds. Average battery assays, $30.26; average car-sample assays, $35.58.

OCCIDENTAL.—From the west ledge on 300 and 400 levels we are extracting aud milling abont 5 tons of ore per day of the average valne of $32 per ton, as per car sample. Have milled during the week 60 tons of the average valne, as per battery samples, of $27 per ton.

KENTUCK.—Have extracted from the west ledge on the 1100 level about 20 tons of ore per day of the average valne, as per car samples, of $8 per ton in gold. The sonth drift from the joint east crosscut is in 24 feet; face in low-grade ore.

WAAU SHAFT. — The west drift from the station, 820 level, is out 52 feet from the shaft; face is in porphyry.

BULLION.—The west drift from the station, 820 level, Ward shaft, is ont 52 feet from the shaft; face is in porphyry.

EXCHEQUER.—The west drift from the station, 820 level, Ward shaft, is out 52 feet; face is in porphyry.

ALPHA.—The west drift from the station, 820 level, Ward shaft, is ont 52 feet from the shaft; face is in porphyry.

NAW YORK.—No work has been done in the mine dnring the past week.

Pioche District.

YUBA SHUTS DOWN.—Pioche *Record*, Aug. 9: Work at the Yuba mine will be snspended this evening. No ore has been extracted from the mine since the recent drop in silver, the workmen being engaged in timbering the shaft and drifting to connect with the Mazeppa shaft. The company has a force of men putting in order the works on No. 3 of the Meadow Valley group, preparatory to the resumption of work in the mine.

ARIZONA.

TWENTY-STAMP MILL.—*Journal-Miner*: Four mechanics from Fraser & Chalmer's Works in Chicago have arrived to erect a 20-stamp mill on the Henrietta mine (recently known as the Yankee Girl) in Big Bug district. The machinery is due to arrive this week, and will at once be shipped to its destination. A new and rich strike is reported to-day from ths Husted mine on the Hsssayampa made by Joe Goff. The ore assays $375 in gold and a 20-inch vein is the size. It is snlphnrets, and will be shipped.

IN NOATHEEN AAIZONA.—Prescott *Courier*: Northern Arizona has more good gold and silver mines than any similar area in the world. Mining of either of the metals, if properly prosecuted, will add many millions yearly to the world's wealth. We have many good gold mines and many good silver mines that only await the advent of capital for the one and favorable legislation and capital for the other to place onr Territory in the front rank as a producer of the precious metals. There are also within our borders some of the greatest copper-producers in the country, chief among them being the United Verde of this conuty and the Bisbee and Morenci mines of Cochise and Graham. The mining world is now looking for gold propositions, and of these we have enough to employ thousands of men in the districts of this county, of which Prescott is the central point.

AT WORK ON GOLU.—Prescott *Journal-Miner*: The slump in silver has seriously affected miniug operations in this section by causing a cessation of work in exclusive silver mines, as well as properties which prodnce both of the precious metals. But, while such is the case, it is very lucky that gold is the predominating metal, and that for nearly every silver mine that has closed down a gold property has been started to work. A list of the mills now in operation which have been erected recently, as well as others which are in process of constructiou, will surprise even those residing here who have not taken the trouble to count them. Those in operation are as follows: The Virginia gold mill at Yarnell, 10 stamps; the Kerr mill at Stanton, 10 stamps; the mill of A. T. Marsh at Minnehaha, 10 stamps; the Commercial Mining Company's mill on Big Bng, 10 stamps; the mill of the McCrnm Sampling and Ore Works at the Silver Belt, 10 stamps; Old Reliable, in Bradshaw mountains, 5 stamps; the Pratt mill, J. R. Ritchie, lessee, on Big Bug, 5 stamps; John S. Jones, in Chaparral, 5 stamps, to be iucreased soon to 15 stamps. A lease has been taken recently on the Wire Gold miue, near Squaw Peak, on which there is a 10-stamp mill, which will he started up soon. Mr. Burson has a Burson mill of 10 stamps capacity under process of construction on the Hassayampa. Dr. J. Miller is puttiug up a five-stamp mill on his Westlake mine, four miles south of town, which he expects to have in operation within the next 30 days, and, if it proves a success, the capacity will be doubled and probably trehled soon. The McCabe Mining and Milling Company has a portion of the machinery for a five-stamp mill now on the grouud and has men at work preparing to put it in place. This one is expected to start work within six weeks. Tbe Henrietta Mining Company, the recent purchasers of the Yankee Girl, and two other mines in Chaparral, have ordered a 20-stamp mill to he erected on thia property. Brown and Barrett have contracted for a five-stamp mill for their mine on Castle creek. The above is a list of those now in operation or already contracted for, while negotiations are now in progress for several other good gold properties, which, if cousummated, will reqnire the erection of additional mills.

OREGON.

BUYINO GOLU DUST. — Jacksonville *Times*, Aug. 11: Beekman & Reames' bank has been buying more gold dust this year tbau any during a long time. . . The Hope mine in Talent precinct, which belongs to G. S. Butler, I. W. Burriss, S. D. Taylor and others, as also two locations on extensions of the same, have been bonded to Gund & Edwards of Seattle, Wash., for $12,000. . . Work is steadily progressiug on the new tunnel of the Asbland mine, which will be 600 feet long when completed. Although the hardest rock is encountered, the Burleigh drill is moving ahead at the rate of five feet a day. . . Wimer Bros., who own extensive placer mines in Waldo district, have made a partial clean-up Our represeutative, while at Grant's Pass last week, saw two bags of gold, weighing nearly 40 pounds, which had been taken out so far. It was something handsome to look at. As this represents nearly $10,000, it will readily be seen that Messrs. Wimer will have a profitable season.

THA GLOBE LEUGE.—Rogue River *Courier*: Razee and Boynton are driving a 250-foot tunnel at the base of an old ahaft on Thompson creek, a tribntary of the Applegate. Some $30,000 had formerly been taken ont of the mine, but the property fell into litigation and so Razee and Boynton have purchased the claim and gone to work. Pay ore is being followed along the line of the new tunnel.

SALE OF THE LITTLA DAISY.—Ashland *Tidings*, Ang. 11: The sale of the Little Daisy miue, of Hammersly and sons, at the head of Jnm-off-Joe creek, to a company of Colorado and Idaho capitalists, was reported last Friday. The purchasers are J. M. Bnrke and T. D. Drew, and the price is said to be $40,000. Tbe mine is upon a lead of soft or decomposed quartz which varies in thickness from a few incbes to 14 inches, and yields from $50 to $1000 to the ton. It was located last fall, and the development consists of a 70-foot shaft, from which drifts have been run a total length of not over 60 feet. The new purchasers intend to put up a 10-stamp mill. Mr. Burke is a prominent Idaho miner, and ran for Governor of that Territory last year. . . A large number of men are at work in the Bohemia mining district near Cottage Grove. . . The new 5-stamp mill of the Lncky Bart mine on Sardine creek is expected to be started the last of this week. . . W. H. Hampton, the Portland assayer, was in Ashland last Saturday, and it was learned that he has bought the Dysert property of 514 acres, on Grave creek, 10 miles east of the railroad. The price was $8000. The

property consists of rich placer ground and also includes quartz ledges that prospect well. Mr. Hampton and those who will be interested with him, purpose the opening of a 10-mile ditch to work the placers, taking the water from Grave creek within the Jackson county boundary lines.

MONTANA.

NO SHUTDOWNS HERE.—Butte *Inter-Mountain*, Aug. 12: The week in mining circles has been uneventful, but this in itself is good news. There have not been any shutdowns or suspensions of operations, while in the copper-mining industry much new work is in progress. Two of the big mining companies disbursed over $100,000 in the channels of trade, and the coming week several of the other large concerns will have pay days. One week from to-day the Butte & Boston Company will pay off. The Heinze Company will also distribute about $20,000 the coming week. The following week the Anaconda pay days will roll around. The copper industry, together with the construction of the new railroad to Anaconda, has greatly relieved what might otherwise have proved a dull season. All the Anaconda, Butte & Boston, Boston & Montana, and Parrot mines are regularly producing ore. Train loads go to the smelters at Anaconda and Great Falls daily. The Butte & Boston company is working five mines, but only two—the Gray Rock and Silver Bow—are producing ore. This company secured the Comanche mine during the week, having purchased the lease held by Patrick Mullins. The lease extends to August, 1894, and the bond of $200,000 is due in October of this year. The Comanche is one of the most promising copper properties in the district. The Butte & Boston Company is actively engaged in developing the Comanche. It transpires that Mr. Mullins and his partners were paid $10,000 for the lease of the Gambetta. Mr. Leggatt receives 30 per cent royalty of the ore produced during the lease. Meantime, silver mining in Butte is stagnant. Not a bullion shipment has been recorded in weeks, and there is not likely to be any in some time. The Eveline mine is still producing ore, but inasmuch as the ore carries about $50 per ton in gold, the fortunate owners are not affected as seriously as the other mines of the county. The search for copper and gold in new or abandoned districts continues. West of this city there is considerable activity in developing copper properties. In some cases miners are working for their board, to be paid full back wages if the developments prove profitable. Everywhere are to be found miners prospecting for gold, and, while no bonanzas are being uncovered, the results show a material increase in the output of the yellow metal.

WASHINGTON.

THE MOYEA PLACERS.—Bonner's Ferry Special, Aug. 7: There is a good deal of excitement on account of the recent discoveries of gold on the Moyea river, 12 miles northwest of here. Three weeks ago John Hoban panned out a few shovelfuls of dirt and found 30 good-sized colors. He reported the matter in Bonner's Ferry, and there are now nearly 100 prospectors on the Moyea. Thus far the gold found is flake gold and has a fine color. It does not appear to have been washed very much. All the colors have been taken from surface gravel, but several shafts are being sunk. There is plenty of water, and the gravel is easily washed.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JULY 11, 1893.

501,240.—WIRE FENCE STAY—G. S. Bartholomew, Gawanza, Cal.
501,400.—EXCAVATOR—H. P. Bennett, Phœnix, A. T.
501,411.—PLATFORM SPRING GEAR—J. P. Farrell, S. F.
501,142.—SAFE—C. Hill, Seattle, Wash.
501,240.—REFRIGERATOR—J. H. Hise, Los Angeles, Cal.
501,348.—TRESTLE—G. H. Jaquess, Riverside, Cal.
501,285.—CULTIVATOR—M. Macleod, Los Angeles, Col.
501,467.—CABLE GRIP—R. A. McLellan, Portland, Or.
501,433.—CRUSHING MILL—W. A. Merralls, S. F.
501,373.—FIRE ESCAPE—S. D. Silver, Seattle, Wash.
501,391.—GAS BURNER—M. Wheeler, Oakland, Cal.

FOR THE WEEK ENDING JULY 18, 1893.

501,780.—TREATING GARBAGE, ETC.—Best & Hall, Seattle, Wash.
501,761.—TREATING GARBAGE, ETC.—Best & Hall, Seattle, Wash.
501,489.—GUIDE SUPPORT FOR HOSE REELS—W. F. Bowers, S. F.
501,819.—UMBRELLA COVER—MRS. M. C. S. Brown, Berkeley, Cal.
501,557.—CONCENTRATOR BELT—J. S. Browoell, S. F.
501,764.—GRIP-OPENER—W. P. Courtney, Oakland, Cal.
501,677.—SIDE WALL FOR CARS—L. D. Craig, S. F.
501,765.—SPRING GUN—W. H. Cram, Penawawa, Wash.
501 790.—CAR-AXLE BEARING—O. B. Jacobs, Fremont, Wash.
501,793.—STEAM ENGINE—A. Knudseo, S. F.
501,805.—CAR COUPLING—T. B. McDermott, Portland, Or.
501,729.—FURNACE—J. E. Needham, Mt. Tabor, Or.
501,848.—EVAPORATING PAN—E. R. Shaw, Los Gotos, Cal.
501,741.—DENTAL ARTICULATOR—G. W. Simpson, Santa Barbara, Cal.
501,584.—TUBE FRAME—Toulouse & Delorieux, S. F.
501,813.—GATE—G. F. Voight, Lower Lake, Cal.
501,637.—ROOF BLOCK—Whomes & Gilmore, Los Angeles, Cal.

FOR THE WEEK ENDING JULY 25, 1893.

502,217.—CALCULATING DEVICE—D. L. Albert, Fort Bragg, Cal.
502,222.—WEIGHING SCALE—W. F. Burns, S. F.
502,224.—NIPPLE-HOLDER—Jos. Canney, Butte, Mont.
501,991.—HOP TRELLIS—David Craig, Macleay, Or.
502,035.—FEED-WATER HEATER—Field & Clark, Los Angeles, Cal.
501,999.—GRA-CRUSHER—A. Fraser, S. F.
502,073.—WATER GAUGE—F. H. Hausman, S. F.
502,255.—GAS ENGINE—G. E. Hoyt, S. F.
502,259.—COMBINATION TOOL—A. Knudsen, Tucson, A. T.
501,952.—STEAM COOKER—Long & Kline, Halsey, Or.
502,051.—SEED-SOWER—Nightingale & Stearns, Oakdale, Cal.
502,211.—BITUMINOUS-ROCK MACHINE—E. R. Thomason, S. F.
22,646.—DESIGN FOR RULER—Sarah S. Freeman, Los Angeles, Cal.

Market Reports.

The Markets.

SAN FRANCISCO, Aug. 17, 1893.

The silver market during the week improved sharply, and a better feeling seems to be noticeable since the meeting of Congress. Curiously enough, one result of the President's message, which was exceedingly hostile to the silver interests, was to strengthen the market, both in London and New York, so that last Thursday in New York the quotation was 75¾ cents, an advance in one week of 4¾ cents. The improvement in London was 1¾ pence. Since then, something like former quietness has been resumed.

The prospect for silver appears to be much better than for some time. Previous to the meeting of Congress, it was assumed that the sentiment of the country was such that unconditional repeal of the Sherman law was inevitable. But it now appears certain that the silver men are going to be an important factor in determining the legislation of Congress and it may be that the Sherman law will not be repealed at all. If it is, a substitute of some kind recognizing silver will be enacted. It is consideration of these things that has recently given the silver market a much better tone.

San Francisco Metal and Coal Market.

ANTIMONY.			STEEL.		
Per lb	— @	14	English, lb	— @	18
BORAX.			Canton tool	— @	8½
Refined, in car lots	— @	7½	Bl'k Diam'd tool	8½@	15
Powdered, do	— @	7½	Pick & Hammer	9@	10
Concentrat'd, do	— @	8½	Machinery	4@	5
All grades jobbing at advance.			Toe Calk	— @	4½
COPPER.			TINPLATE.		
Bolt	22 @	—	B. V. steel grade		
Sheathing	22 @	—	14x20, spot	— @	5 87½
Ingot, jobbing	— @	14½	Charcoal, 14x20	— @	5 87½
Do, wholesale	— @	13½	Do roofing, 14x20	— @	5 87½
Fire Box Sheets	22 @	24	Do, do, 20x28	—@	11 75
IRON.			PIG TIN.		
Bar, base	— @	3	Spot	— @	24
Norway, base	— @	4½			

PIG IRON.	Spot.		COAL.	
Eglinton ton	20 00@	— —	SPOT FROM YARD—PER TON.	
Glengarnock	21 00@	— —	Wellington	$8 00
Am. Soft, No. 1	22 00@	— —	Greta	7 50
Shotts No 1	22 00@	— —	Nanaimo	8 00
Puget Sound	20 00@	— —	Gilman	8 00
Olay Lane White	21 00@	— —	Seattle	5 50
Langloan	22 50@	— —	Coos Bay	5 50
Gartsherrie	22 50@	— —	Cannel	8 50
Barrow	22 50@	— —	Egg, hard	12 00
Carnbroe	22 00@	— —	Wallsend	7 25
CHROME IRON ORE.			Scotch Splint	8 00
Per ton	10 00 @	— —	Brymbo	7 50
LEAD.			West Hartley	8 00
Pig	— @	4½	TO LOAD—PER TON.	
Bar	— @	5½	Australian	5 37@ — —
Sheet	— @	7½	Liverpool Steam	6 50@ — —
Pipe	— @	8½	Scotch Splint	00@ — —
SHOT.			Cardiff	5@ — —
Drop, sizes *smaller* than B, bag of 25 lbs		$1 80	Lehigh Lump	11 00@ — —
Do do, B and *larger* sizes bag of 25 lbs		2 00	Cumberland	12 00@ — —
Buck, Bolls and Chilled do, bag of 25 lbs		2 00	Egg, hard	10 00@ — —
QUICKSILVER.			West Hartley	7 50@ — —
Home trade, pr. flask		40 00 @40 50	COKE.	
			English, to load	$9 50@10 00
			Do, spot, in bulk	—@10 00
			Do, in sacks	— —@11 50
			Cumberland	9 50@— —

Silver and the Metals.

NEW YORK, Aug. 17.—Following are the closing prices for the week:

	Silver in—				
	Londn.	N. Y.	Copper.	Lead.	Tin.
Thursday	34¾	75¾	9 65	3 25	18 40
Friday	34⅝	75	9 65	3 30	18 4n
Saturday	34½	74	9 65	3 3n	18 4n
Monday	33¾	72½	9 65	3 3n	18 45
Tuesday	33⅛	72½	9 65	3 32½	18 2n
Wednesday	33¼	72½	9 50	3 32½	18 20

Mining Share Market.

SAN FRANCISCO, August 17, 1893.

The mining share market has been quiet during the week, Comstocks showing much weakness. Offerings are small and mostly from chippers and speculating brokers who are shorting the market, hoping that it will drop a few cents and give them that much profit.

The mining expenses on the Comstock this month will be the smallest of any month in the last 30 years, owing to the cutting down of salaries, the discharge of miners along the lead and other curtailment. At no time in these last 30 years has there been such a small force of men employed in the mines. It now amounts to about 270 miners actually at work underground. It is reported that, should the miners decide not to accept a reduction of wages by the end of the month, there will be a further reduction in the force and several more of the mines are likely to suspend all operations.

The Savage mine did well last month and earned $150 more than its expenses. Chollar is one of the steadiest stocks on the list and is beginning to attract attention. The stock which showed the most weakness yesterday morning was Consolidated California and Virginia, which up to to-day has shown much strength. There was a decline to $1.25, and most of the other north-end stocks declined a little in sympathy.

The North Banner Mining Company of Nevada county has levied an assessment of two cents per share.

The Gold Flat Mining Company of Nevada county has levied an assessment of five cents per share.

The Planet drift gravel mine at Lowell Hill has been bonded to Charles H. Richardson, who will put ten men at work.

The Miners' mill at Bodie is being put in order for a run on ore from the Eva and Sunshine mines.

Another California gold-mining company—the Gray Eagle, of the Forest Hill Divide—made application yesterday morning to the San Francisco Stock and Exchange Board to have its stock listed.

The Hermit Mill and Mining Company of Mokelumne Hill has levied an assessment of 1½ cents per share, delinquent September 16th.

The delinquent sale of the Hale & Norcross Mining Company will be held on Friday this week, and there are still 65,000 shares of the 112,000 shares of capital stock on which the assessment of 50 cents per share has not been paid.

The Bodie *Miner* says the Bulwer did not have its regular pay day on the 5th of this month, but instead will pay on the 20th.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY AND LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T AND SALE.	SECRETARY.
Alhambra M Co, Nev	17	25c	July 14,	Aug 18, Sept 11	F S Schwarze, 324 Washington
Alpha M Co, Nev	60	25c	July 31,	Sept 4, Sept 25	E B Holmes, 309 Montgomery
Alta M Co, Nev	43	15c	April 25,	Aug 21, Sept 8	309 Montgomery
American and Mexican M Co	10	2c	June 28,	July 31, Aug 19	F M Husted, 522 Montgomery
Belcher M Co, Nev	46	25c	July 31,	Sept 4, Sept 25	C L Perkins, Mills Bldg
Bodie Cons M Co, Cal	10	15c	July 24,	Aug 28, Sept 25	M E Willis, 309 Montgomery
Bulwer M Co, Cal	8	10c	July 20,	Aug 31, Sept 22	L Osborn, 309 Montgomery
Carmelo Land and Coal Co, Cal	5	8½	July 21,	Sept 1, Sept 20	R McDoible, Mills Bldg
Chollar M Co, Nev	35	10c	July 31,	Sept 5, Sept 25	C E Elliott, 309 Montgomery
Clinton M Co, Cal	2	15c	Aug 9,	Sept 18, Oct 2	C E Gunn, Mills Bldg
Confidence S M Co, Nevada	23	25c	Aug 7,	Sept 11, Oct 2	A S Groth, 414 California
Eclipse M Co	5	2c	July 27,	Sept 4, Sept 25	O Tum Suden, 216 Bush
Evening Star M Co, Cal	10	1o	Aug 9,	Sept 12 Sept 30	J J Scoville, 320 Sansome
Exchequer M Co, Nevada	36	1c	June 29,	Aug 31, Sept 21	C E Elliot, 309 Montgomery
Gold Mountain M Co, Cal	5	$1½	July 13,	Aug 16, Sept 4	J F D Curtis, 325 Montgomery
Gray Eagle M Co, California	33	——	July 10,	Aug 16, Sept 14	C C Harvey, 309 Montgomery
Inyo Marble Co, Cal	21	5c	Aug 8,	Sept 12, Oct 12	W W Sargeant, Mills Bldg
Jackrabbit M Co, Cal	4	5c	Aug 10,	Sept 15, Oct 6	Thos Wetzel, 320 Sansome
Justice M Co, Nev	55	10c	July 31,	Sept 5, Sept 25	R E Kelly, 309 Montgomery
Keutuck Cons M Co, Nev	5	10	July 11,	Aug 15, Sept 5	A Waterman, 302 Montgomery
Lady Washington M Co, Nev	9	10c	April 18,	Aug 9, Aug 30	L Osborn, 309 Montgomery
Mexican M Co, Nev	48	25c	July 17,	Aug 22, Sept 12	C E Elliott, 309 Montgomery
Occidental Con M Co, Nevada	13	10c	June 22,	Aug 16, Sept 5	A K Durbrow, 309 Montgomery
Ophir M Co, Nev	60	25c	July 31,	Sept 4, Sept 25	E B Holmes, 309 Montgomery
Potosi M Co, Nevada	38	25c	July 11,	Aug 15, Sept 5	C E Elliott, 309 Montgomery
Sag Belcher and Mides Con M Co, Nev	12	10c	July 28,	Aug 29, Sept 18	E B Holmes, 309 Montgomery
Sierra Nevada S M Co, Nevada	105	20c	Aug 2,	Sept 5, Sept 25	E L Parker, 309 Montgomery
South Eureka M Co, Cal	5	1½	Aug 2,	Sept 4, Sept 29	A Halsey, 318 Montgomery
Teresa M Co, Mex	11	10c	Aug 3,	Sept 11, Sept 27	K J Willats, 809 Market
Ventura Asphalt Co, Cal	1	50c	July 11,	Aug 26, Sept 18	F. A. Brooks, Monty'g Block
Waterloo G M Co, Cal	4	15c	Aug 2,	Sept 4, Sept 25	J M Bailey, 18 Post
Yellow Jacket M Co, Nev	55	25c	July 29,	Sept 5, Oct 9	W H Blauvelt, Mills Bldg

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Arnold G & S M Co, California	Annual	A Judson, 320 Sansome	Sept 5
Colorado River Placer M Co, California	Annual	B M Bradford, 230 Montgomery	Aug 21
Independence M Co, Nevada	Annual	J W Pew, 310 Pine	Aug 21

DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE
Bulwer Cons M Co, California	5	L Osborn, 309 Montgomery	Oct 20
Champion M Co, California	10	T Wetzell, 310 Pine	May 15
Cons New York M Co, Nevada	10	O E Elliott, 309 Montgomery	Feb 15
Great Western Quicksilver M Co	25	A Halsey, 338 Montgomery	Oct 8
Mayflower Gravel M Co, California	10	D M Kent, 330 Pine	June 30
Pacific Coast Borax Co., California	1 00	A H Clough, 230 Montgomery	Jan 10
Standard Cons M Co., California	10	J W Pew, 310 Pine	July 25

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

LAWN SPRINKLER.—Thos. Scheen, Oakland. No. 502,641. Dated Aug. 1, 1893. In a former patent, No. 436,942, issued to the same inventor Sept. 23, 1890, a sprinkler was shown having a partially formed slot extending outwardly from the central opening of the sprinkler, and the present invention is an improvement upon the former device. The spray or sheet of water delivered from the discharge opening is in the form of a narrow sheet, and is especially applicable to the irrigation of narrow borders where it is undesirable to throw a large quantity of water upon paths or other points which it is not designed to irrigate.

CHURN.—Rose A. Ludlow, Globe, Tulare Co., assignor of two-thirds to L. C. F. Wynne and O. H. O. Wynne, of Hanford. No. 502,628. Dated August 8, 1893. The objects of this invention are to provide a churn which, by reason of the effective shaking imparted to the cream-containing vessel, will make the butter with certainty and in short time, and also, by reason of the adjustability of each vessel, will provide for proper positions at the several stages of the operation.

STATION INDICATOR.—Henry G. Krasky, S. F., assignor to U. S. Indicator Co. No. 502,625. Aug. 1, 1893. This is one of that class of exhibiting devices for railway care in which the indicator or exhibitor mechanism is operated by power transmitted through suitable connections from the axle. The device is intended to compensate and provide for any inaccuracy due to "slipping," by so constructing the power-transmitting connections from the axle that they shall be automatically thrown out of and into action at given times and points, and set initially at the beginning of each round trip.

FRICTIONAL MOTION-TRANSMITTER.—Wm. H. Masterman, Oakland, assignor of two-thirds to W. M. Rank and F. H. Meyers. No. 502,570. Dated Aug. 1, 1893. The object of the invention is to provide a mechanism whereby motion may be gradually communicated from a motor to the part to be driven, whereby the latter may be started without bringing too great a strain or injury on the driving parts. In the patent the invention is shown as applied to an electric motor, but it may be used equally well to transmit power in any machinery.

CALIFORNIA MACHINE WORKS,
WM. H. BIRCH & CO.,
ENGINEERS AND MACHINISTS,
No. 119 Beale St., - - San Francisco.
—BUILDERS OF—
Steam Engines, Saw Mills, Mining Machinery, Dredging Machines, Rock Crushers, Cable Railway Machinery, Ellithorp Air Brake Co.'s Patent Steam and Hydraulic Elevators, Air Cushions and Air Brakes. POSITIVE SAFETIES. Improved Ram Elevators, Sidewalk and Hand Hoists. B. E. Henrickson's Patent Automatic Safety Catches.
Machines of all kinds Made and Repaired. Orders Solicited.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, August 17, 1893.

9:30 A. M. SESSION.

200 Challenge	10c	200 Mexican	80c
300 Chollar	30c	100	55c
300 Con. Cal. & Va	1.30	500 Potosi	55c
350 Gould & Curry	30c	100 Sierra Nevada	25c

2:30 P. M. SESSION.

100 Belcher	20c	250 Mexican	50c
100 B & E	55c	200 Ophir	60c
350 Bodie	5c	510 Potosi	50c
100 Crown Point	25c	250 Sierra Nevada	25c
450 Con. Cal. & Va	1.25	100 Union	35c
160	1.20	50	30c

Pacific Stock Exchange.

9 AND 10:15 A. M. SESSIONS.

300 Best & Belcher	55c	300 H & N	51c
300 Bullion	18c	400	50c
500 O C &	1.30	1000 Kentuck	1pc
10	1.20	200 L Wash	7c
300	1.25	100 Ophir	60c
200 O Imperial	2c	50	61c
100 Crown Point	27c	100	63c
50	25c	100 Overman	5c

2 P. M. SESSION.

100 C. O. & Va	1.20	100	52o
400	1½	100 Hale & Norcross	50c
100 Mexican	51c	150 S Nev	27o

Cal. Debris Commission Notices.

NOTICE.—The California Debris Commission, duly appointed under the Act of Congress of March 1, 1893, having received a petition of R. M Mooer and J. O. Boyd for permission to mine by the hydraulic process at the Kelly Hill Gold Gravel Mining property, situated in Butte County, in sections 27 and 28, Township 23, N., Range 3 East, and to deposit tailings in Neshit and Brewer Gulches, which discharge into Big Butte Creek, gives notice to all concerned that a hearing will be held at the office of the Commission, Room 50, Flood Building, San Francisco, on August 29, 1893, at 1:30, P. M. On and before this hour and day all parties interested may file affidavits, plans and maps, in support of their respective claims. By order of the Commission; W. H. Heuer, Major, Corps of Engineers, U. S. A., Secretary.

NOTICE.—The California Debris Commission, duly appointed under the Act of Congress of March 1, 1893, having received a petition from N. C. Tully for permission to mine by the hydraulic process in the Omega Mining District, situated at the village of Omega, Washington Township, Nevada County, California, and to deposit tailings behind a dam in Scotchman's Creek, which discharges into the South Yuba River, and having also received a petition from Robert McMurray, attorney-in-fact for the Eureka Lake and Yuba Canal Company Consolidated, for permission to mine by the hydraulic process the Farrel mine, situated near Columbia Hill, Nevada County, California, and to deposit tailings behind a dam in an old hydraulic pit, gives notice to all concerned that a hearing will be held at the office of the Commission, Room 92, Flood Building, San Francisco, on September 4, 1893, at 1 o'clock P. M. On and before the hour and date, all parties interested may file affidavits, plans and maps in support of their respective claims. By order of the Commission; W. H. Heuer, Major, Corps of Engineers, U. S. A., Secretary.

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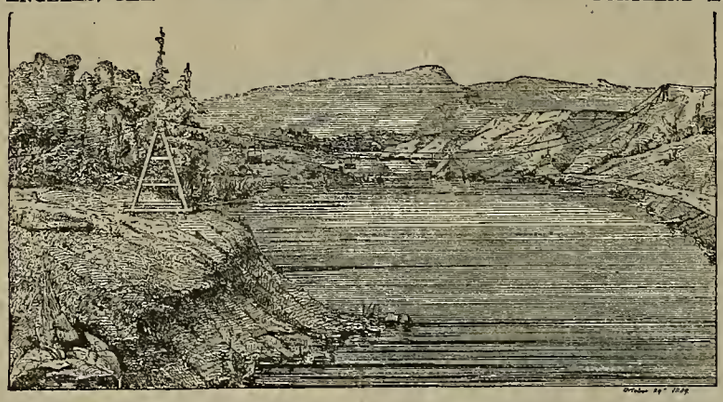

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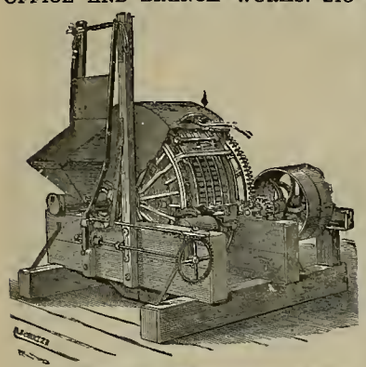

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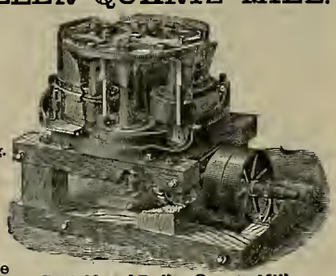

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VOL. LXVII.—Number 9.
NEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, AUGUST 26, 1893.

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More Currency a Necessity.

It is one of the anomalies of the present crisis that the bankers of Wall street are unanimous for more currency and less silver. They ask Congress to revise the banking laws in such manner that they may extend their circulation without adding one cent to their assets, and without putting up one cent to guarantee the additional issue. Their position is notable for its inconsistency. They have always opposed a greater increase of the circulating medium in silver, declaring that there was enough gold and silver for the business of the country. They feared inflation because of increase of silver coinage, and, when they could, opposed the freer circulation of silver certificates, which represent a money metal intrinsically valuable. Now they find their position untenable and they ask an increase of currency by removal of restrictions in the banking laws. If this is not a step toward what these bankers formerly called inflation, what is it? It has been demonstrated by experience that the circulating medium is insufficient in volume. All agree now on that proposition. But the banks say it should be increased by extension of their credit; the people by greater use of a money metal of intrinsic value. The banks ask increased privileges and greater power that the financial system of the country may be placed on a basis of gold on the one hand and credit—their credit—on the other. The people demand the basis be gold and silver equally on the one hand and their own credit on the other.

It ought to be plain that the nearer the country can approach a cash basis, the safer and sounder will be its business. The people are right.

THE bids for making a new mouth for the Yuba river near its present confluence with the Feather river were opened by Major W. H. Heuer of the United States Engineer Corps last week, and his recommendations in regard to the same have been sent to Washington. There were five bids. There was very small difference between the lowest, those of the California Construction Company and Wm. Elliott, Sr., of Gridley, the two being as follows in detail: Mr. Elliott's bid for the 236,000 cubic yards of earth was 17½ cents per cubic yard; for 1000 tons of rock, $6 per ton, and for 2500 cubic yards of brush, $1 per cubic yard. The California Construction Company's bid for 236,000 cubic yards of earth, 17¾ cents per cubic yard; for 1000 tons of rock, $3.40 per ton, and for 2500 yards of brush, $1 per cubic yard. The whole amount of the work calculated by these figures will cost over $48 000. The distance is 2500 feet. The canal will be 350 feet wide and 13 feet deep on an average.

THE question of miners' wages on the Comstock seems to be as far from settlement as ever. The miners are very firm in opposing reduction, and they say they are prepared to resist the attempt to the last. At a meeting of the Virginia City Miners' Union last Saturday night, the committee to which was referred the proposal of H. Zadig and C. H. Fish, that a reduction of 25 per cent be made, reported in favor of a conference being held with the mine superintendents to consider the matter. A resolution was unanimously passed that the suggestion of the committee be ignored and that no further attention be paid to the proposition. The Storey County Mechanics' Union took the same action as the Miners' Union on the wage question.

THE engineering congress recently held in Chicago was the most notable gathering of the kind in recent years. The attendance of members, foreign and native, was large, and the interest in proceedings general and continuous. There were seven divisions represented in the congress—civil engineering, mechanical engineering, mining engineering, metallurgical engineering, engineering education, military engineering and marine and naval engineering. Each division held a daily session for five days, occupying the entire morning, and on Saturday a joint final session was held to make an appropriate conclusion to the work of the week. All the great nations of the world and many of the smaller countries were represented by engineers of eminence who were earnest in their praises of the valuable opportunities they had enjoyed for exchanging views, learning lessons from the record of practice and experience, discussing results, and acquiring information on important subjects connected with their various professions.

"GRIZZLY GIANT"—ONE PRODUCT OF A MINING COUNTY.

Big Trees in a Mining County.

Mariposa is a California county that has contributed immensely to the mineral wealth of the State. The county is seamed with quartz veins and is penetrated by the Mother Lode. The run of ores yields from $10 to $15 per ton, though numerous pockets are struck here and there running up into the hundreds per ton. There are several fine veins of good marble in the county. Silver and copper are also found. In topography, the county resembles Amador, Calaveras and El Dorado, and it shares with Calaveras, Tuolumne, Fresno and others the possession of the marvelous sequoia forests which have made that region famous. Besides, the world-famed Yosemite valley is in the northern part of the county, so that it has altogether better known scenic attractions than any other part of the State.

The sequoias—a type of which is chosen as subject of illustration—are mammoths among trees, the Methusalehs of the forest. The sequoia timber belt along the Sierras extends from Calaveras on the north to near the head of Deer creek on the south, about 200 miles. The sequoias are natives of California and are never seen outside this belt. They seem almost imperishable. No known trees in the world compare with them and their kin, the redwoods, for gigantic size. A tree from 300 to 400 feet high, 30 feet thick in the trunk is a great curiosity, and yet there are a number of such. In the Calaveras Big Tree grove there are 150 trees more than 15 feet in diameter and ten about 30 feet. One of the fallen monarchs must have been 450 feet high and 40 feet in diameter. The "horseback ride," as it is called," one of the wonders of the grove, is a hollow trunk through which a man can ride upright on horseback 75 feet, and theatrical performances have been given in it.

The State grove, in Mariposa county, is 15 miles south of Yosemite, and has 427 trees, including 134 over 15 feet in diameter, 18 over 25 feet, and three over 33 feet. A daily stage coach has been driven through one, 120 children and a piano crowded into another. A single tree would furnish two-rail fencing 20 to 30 miles. The cut on this page shows admirably the immensity of the trees.

THE New Grand Victory Gold Mining Co. was recently incorporated. Directors—M. Thomson, W. C. Stratton, T. Clark, S. B. Clark and J. Gordon.

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San Francisco, August 26, 1893.

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THE industrial situation in the East appears to be materially improving. Factories are starting up everywhere, and everything points to an early return to a normal state of things. At Pittsburg, Monday, employment was given to between 12,000 and 15,000 idle men by the resumption of operations in the iron and steel plants. Among the mills resuming are the Black Diamond Steel Works, portions of Jones & Laughlin's iron and steel plant and the National Tube Works. Havemeyer's sugar refinery at Williamsburg, New York, resumed operations, giving employment to 4000 hands.

THE sale of delinquent stock of Hale & Norcross, advertised for Friday, August 18th, has been postponed until September 8th. The number of shares advertised as delinquent amounted to 71,000 out of the 112,000 shares of capital. Up to 1 o'clock Friday the number of shares thus delinquent had been reduced to 67,000, which were more than one-half of the capital stock. The directors of the mine, realizing that the bulk of this unpaid stock would go into the treasury of the company, held a meeting and resolved to postpone the sale for twenty days, so as to give the delinquents a last chance to save their shares.

THE temporary paralysis of silver has directed attention of Colorado miners to gold, just as it has in California. The miner is nothing if not the embodiment of activity, and, while silver is down, he hunts gold. On every creek and canyon where color is to be found, men are swarming by hundreds. The Denver *Mining Industry* says a few are making wages, more are making only grub, and most are living on hopes. But the few old miners who understand that kind of work can all make at least grub wages. It is scarcely possible to tell where men are not washing for gold. It would be easier to tell on what streams they are not than on what streams they are.

THE Sutter *Independent* reprints the formal application of Messrs. Mooer & Boyd for permission to operate hydraulic mines, and appears to think that a grave menace to the future well-being of the valley farmers lies therein. If the *Independent*, or any others along the rivers, are disposed to proceed in a lawful manner, they may find ample opportunity to defeat the application of Messrs. Mooer & Boyd should the properties of any adverse parties be endangered or impaired in value by the grant of their application. The conditions imposed by the Caminetti law are so manifold, and the safeguards so numerous, that, as between the miner and farmer, the former is at an actual disadvantage. He is required to give assurance in a substantial and satisfactory manner that all other interests will be protected. The first consideration seems to be the farmer; the second the miner. The *Independent* and its friends should tote fair and agree to give the miner a chance under the law.

Price of Bar Silver.

London has long been setting the price of silver bullion. The most recent qnotations are 34⅞ pence per ounce 925 fine, which is England's standard of fineness. This is very low—not so low as in former weeks, but a tremendous depreciation.

The first great collapse in the price of bar silver was in 1876. Up to 1874 the average price of silver had been for many years equal to or above the par of gold. For seventy-three years, from 1760 to 1833, the ratio of pure gold to pure silver varied from 1 to 13.33 in 1781 to a ratio of 1 to 16.30 in 1815. From 1833 to 1858, an ounce of gold bought from 15.19 to 15.93 ounces of silver. For the next quarter of a century, up to 1883, an ounce of gold on the yearly average basis bought from 15.28 to 17.87 ounces of silver. During that entire period of 123 years, the lowest price was in July, 1876, when silver sold in London at 46½ pence per ounce 925 fine. At 46¾ pence the ratio of gold to silver is as 1 to 20.17. At that figure an ounce of pure silver 1000 fine was worth 1.0248, and the 412½ grain dollar, 900 fine, was worth .7926.

Taking the ordinary acceptation of gold as being the standard of valne, the purchasing power of silver has varied considerably. Between 1781—when the least amount of silver was required to buy an ounce of gold—and 1876—when the average showed the greatest amount of the white metal necessary—the purchasing power of silver depreciated 25.4 per cent.

The contraction in values, occasioned by the policy which found its greatest success in the demonetization of silver, is aptly illustrated in the fact that wheat, the greatest of the world's staples, follows the fluctuations of silver with unswerving accuracy, for it is to be observed that whenever silver is depreciated, so also is wheat, the ratio between the values of wheat and silver being as regular as that between the temperature and the thermometer which indicates it. The fact furnishes fitting comment on the twenty years of warfare upon silver, and is suggestive as to the final result of the fight now waging in Congress over the question of silver coinage. Nothing is ever settled until it is settled right, and the only settlement of the question that can result satisfactorily to the financial health of the nation is the restoration of silver to the position from which it was so mistakenly removed twenty years ago.

With silver quoted at 34⅞ pence per ounce in London, and 74¼ cents in this week's 165,500-ounce purchase in Washington, it would seem that bedrock had been reached. The future depends largely, but not wholly, on the 444 national legislators now in session at the capital.

The Three Per Cent Provision.

A very serious objection which hydraulic miners have urged to the Caminetti law is the requirement that they shall pay to the Government three per cent of the proceeds of the mines. They have mistaken the scope and meaning of the provision. The three per cent provision is totally inoperative under present conditions, and, in absence of a Government appropriation to assist in construction of restraining works, it is not likely to be enforced for awhile yet. When it is in active operation, it will affect those miners only whose debris is impounded in the public restraining works.

Major Heuer of the debris commission calls attention to the reading of the law, and says:

Section 23 of the Caminetti Act says in effect that upon the construction by the commission of dams and other works for the detention of debris from hydranlic mines, and the issuing of the order permitting the working of the mine, the owner shall pay thie tax. Now the commission is not building any dams, for it cannot huild them. And it is not just, I think, to reqnire the mine-owners who are put to great expense in erecting snch dams to pay snch a tax, and the law does not so require.

The exact phraseology of Section 23 is as follows:

That upon the constrnction hy the said commission of dams or other works for the detention of debris from hydraulic mines and the issning of the order provided for hy this Act to any individual, company or corporation to work any mine or mines by hydraulio process, the individual, company or corporation operating therennder working any mine or mines by hydraulic process, the debris from which flows into or is in whole or in part restrained by snch dams or other works erected by said commission, ehall pay a tax of three per centum on the gross proceeds of his, their or its mine so worked, which tax of three per centnm shall be ascertained and paid in accordance with regulations to be adopted by the Secretary of the Treasnry, and the Treasurer of the United States is hereby authorized to receive the same. All sums of money paid into the Treasury under this section shall he set apart and credited to a fund to he known as the "Debris Fund," and ehall be expended by said commission under snpervision of the Chief of Engineers and direction of the Secretary of War, in addition to the appropriations made by law in the constrnction and maintenance of such restraining works and settling reservoirs as may he proper and necessary.

The State of California has set aside $250,000 to defray one-half the expense of construction of restraining works. But it is expressly provided that the appropriation ehall not be available until the United States shall have dedicated a similar amount to the work. The Federal Government seems to be in no great hurry to undertake construction of the dams, but, when it is seen that California is in earnest in its desire to resume hydraulic mining, and, through its delegation in Congress, asks that the appropriation be made, the money will doubtless be forthcoming.

The Comptroller's Error.

The present Comptroller of the Currency, a well-meaning but ignorant young man from the prairies of Illinois, talks of "the 65-cent dollar." He means the silver dollar. It is a common error in those of Mr. Eckles' caliber and information to thus speak of that coin. Were things unknown proposed as things forgot it would be in order to remind the monometallists what the meaning is of the term "dollar." The word dollar originally meant a silver coin, and that is its meaning to-day among most people.

It is absurd and unhistorical for our unsophisticated Comptroller of the Currency to say the silver dollar is worth sixty-five cents. It is worth just one hundred cents—and it always has been worth that much. The gold dollar is a modern invention. Millions of people in this country never saw it, and don't know what it looks like. When it was first coined, within the memory of middle-aged men, it was measured by the silver dollar, and made to conform in weight, value and fineness to it. Comptroller Eckles has no authority to invert the historical and established order—place the gold coin before the silver and measure the ancient dollar by its modern coadjutor. It is gold that has grown comparatively scarce and dear—not silver that has grown plentiful and cheap.

SECRETARY OF WAR LAMONT has responded favorably to the request for an additional engineer for the California Debris Commission, and has detailed Lieutenant C. C. Gillette, formerly on duty under the Mississippi River Commission, to the work. Efforts to convince Assistant Secretary of War Grant that he should act in accordance with the design of the law and make the assignment proved unavailing, and Secretary Lamont was appealed to. He asked the Judge Advocate General for his opinion of the legality of the assignment, and was assured it was proper to make the detail subject to the orders of the War Department. It is not very easy to understand the attitude of the assistant secretary in this matter, except on the ground that he had been invested with a little brief authority and wanted to show it. Government officials who are for a few years allowed to wear shoes too large and are obliged to have their hats made to order are often able to delay and even defeat a meritorious measure; but in this case the efficiency of the Caminetti law has not been impaired.

NEVADA may have deteriorated as a mining State, but in other lines it seems to be doing very well. Irrigation has done much for the State in recent years. Census figures at hand show for 1890 as follows: Total acreage cultivated by irrigation, 224,403; total number of farms, 1341; farms irrigated for crops, 1167; average size of irrigated farms, 192 acres; average cost of water rights, per acre, $7.58; average value of water rights, per acre, $24.60; average annual rental, $.84; average first cost of production, per acre, $10.57; average valuation, per acre, $41.00; apparent profit, less cost of buildings, etc., $21.60; average value of products, per acre, $12.92; cost of productive irrigation systems, $1,251,000; value of samé in 1890; $3,714,000; increase in value, $2,463,000; total cost of water and maintaining ditches in 1889–90, $188,000; value of products, $2,899,000; difference, $2,711,000.

AT the regular monthly meeting of the Executive Committee of the Anti-Debris Association, at Sacramento, Tuesday, a report was received from chemist Flint of Marysville, who took samples of water each day dnring the month of July from the Yuba river for the purpose of determining the amount of sedimentary matter carried in suspension. He gave the results of each day's examination, and added that the river was clearer than it had ever been before. These things sound very strange, in view of the oft-repeated assertion of the anti-debris people that the accumulated debris from the former operation of hydraulic mines would continue to befoul and fill up the rivers for many years to come.

SOME attention is being devoted by Spokane newspapers to an invention of a local miner for the development of placer fields. It is described as "a new machine for throwing water on high bars by the force of the current. It is said to carry a large stream of water with little waste of power. The inventor is now experimenting at a point on the Snake river, where he has located a large amount of high ground, rich in gold, but never worked on account of no water being available."

Work of the Debris Commission.

No official information has reached the city of the appointment of Lieut. C. C. Gillette as an additional engineer of the Debris Commission; but the notification will be given in due course of time. Major Heuer, secretary of the Debris Commission, stated to a representative of the PRESS Wednesday that all he knew relative to the assignment was what had appeared in public print. "The duties of Lieut. Gillette will, I suppose, be to facilitate the work of the Commission," said Major Heuer. "Probably he will find that much of his time must be devoted to answering questions relative to the provisions and workings of the Caminetti law, just as I have been doing for some time. The law does not seem to be as fully understood by miners as it should be, though its full text was published in the PRESS and therefore distributed throughout all parts of California. Speaking for myself, and not for other members of the Commission, I am bound to say that the number of applications for license under the law have been less than I expected. I do not know the reason. It may be that miners think that the cost of mine operation under the law will be too expensive; that, for instance, masonry dams must be erected at great expense, in order to confine the debris. Stone dams will be required in torrential streams, but I think it will be found that brush, earthern, and similar works will generally suffice in dry gulches, ravines and in kindred places. On the recent trip of the Debris Commission to the hydraulic mines we saw one brush dam that cost from $7000 to $10,000 and was successfully impounding 400,000 cubic yards of debris.

"There have been ten applications to resume hydraulic mining under the Caminetti Act," continued Major Heuer, "three of which were made formally. The first is from the Kelly Hill gravel mine of Butte county, of which mention has already been made in the papers. The two other formal applications are from the Omega mine and the Farrell mine, in Nevada county, and they will be considered on September 4th. The Farrell mine is being worked because its debris is doing no injury and there is no objection, but the owners of this mine want to come in under the law to avoid all questions. The other applications were not in accordance with form and were returned for correction."

"What do you think is the attitude of the miners toward the law?"

"I do not know. It has not been the business of the Commission to inquire. It is our duty simply to carry out the law as we find it. It makes little difference to us whether the applications are few or many. But where application for license is made, we expedite matters in every practicable way. A committee from the Commission is promptly dispatched to the location of the mine. A thorough investigation is made so that when the Commission comes to act upon the application it shall be thoroughly informed as to what it is proposed to do."

"What about the expense to the applicant?"

"There is practically no expense."

"Will the Commission work in conjunction with the State Debris Commissioner?"

"Certainly. We are required by law to do so. We have already had several informal talks with Commissioner Kidder, and shall confer with him whenever advisable."

Affairs of the Alta Mine.

A very interesting state of affairs was developed at a meeting of the Alta Mining Co., last week. It was known for some time that the finances of the company had been badly muddled, but the stockholders seem hardly to have been prepared for the full extent of the truth. The books of Treasurer Derby had been experted and his accounts failed to balance by $19,173.65. Derby's claim is that he is not a defaulter, but that when he succeeded Seth Cook as treasurer the latter left a shortage of $50,000, and that he himself had paid $30,000 of the deficit. It appears that when he was elected treasurer Derby made no report to the stockholders of this deficit.

It transpired, from statements made by various stockholders, that the present shortage is the result of the formation of the American Milling Company, started by Seth Cook and ex-Treasurer Derby. It is said to have been established at the expense of the Alta shareholders, and a note for $50,000 was given by the American Milling Company to the Alta to cover this debt. The note was unsecured and the American Milling Company appears as a corporation without property.

In addition to securing to the American Milling Company 23,000 shares of Alta stock, the Cook estate turned over its shares to the American. The shares were sold and the proceeds said by Derby to have been applied on this note, although the latter bears no endorsement of the payment of any part of the amount.

Secretary Osborn never charged this amount to bills receivable. If Derby had made no payments on the note, the books of the company would show a false cash balance of $49,000. As it is, $19,173.65 should be on hand according to the books.

Secretary Osborn has made sworn statements every month that such was the case. The stockholders propose to commence actions against Derby, Osborn and the members of the outgoing board of directors. They announced that they would leave no stone unturned to recover the money diverted from the treasury by Derby.

The new set of officers consists Directors John Landers, Herman Zadig, James McBoyle, J. W. Maguire and E. D. Goodrich. John Landers was chosen president; Herman Zadig, vice-president; J. E. Jacobus, secretary; the Nevada Bank, treasurer; and E. D. Boyle was re-elected superintendent. Mr. Landers announced that he would accept the presidency only for the purpose of trying to unravel the financial difficulties of the Alta. He said that if he were not supported in his efforts in this direction he would retire.

The new president is an old mining man. He was an early operator on the Comstock, and until the last eight years he was, for a long period, actively engaged in mining development in Nevada.

The cash turned over to the new board amounted to only $212.50, and the company is $8000 in debt. A policy of retrenchment was inaugurated in all the departments. Secretary Osborn has been paid $250 a month, with $75 for an assistant. The latter has been dispensed with, and the secretary's salary reduced to $150. The superintendent's monthly stipend has been reduced from $300 to $100 a month, and the president's monthly salary from $125 to $75.

THE formal ceremony of breaking ground for the Midwinter Fair took place in Golden Gate Park Thursday, Aug. 24th. The various business houses of the city were closed in honor of the event, the National Guard was paraded in force, and altogether the dedication took place under circumstances that augur much for the success of the exposition. The chief obstacle which the promoters have had to overcome has, of course, been the subscription of funds. So far something like $350,000 has been secured from San Francisco alone, and there seems little doubt that a total of $500,000 will finally be realized. On the whole, it is creditable alike to the local pride and liberality of the people of San Francisco that such substantial interest has been manifested in the enterprise. The bulk of subscriptions has so far come from people of comparatively small means, but it is confidently expected that capitalists will render all necessary aid before the subscription books close. It is unfortunately true that outside counties regard the fair with feelings more indifferent than could be wished. Some newspapers have even taken a hostile attitude because their various counties have been asked to subscribe, claiming that San Francisco will receive the chief benefit and should foot the bill. Precisely the same thing might have been said, with equal justice, by Illinois interior papers, of the Chicago Exposition. But it was not, and the State subscribed $800,000. The Midwinter Fair is essentially a Pacific coast enterprise, and San Francisco is the proper place to hold it. Times are hard and money scarce. But if interior counties can't raise money they might at least do a little hurrahing. There is the right kind of spirit locally behind the fair, and it should be encouraged in every reasonable manner by all people of California and the Pacific coast.

MEETINGS in the interest of silver are advertised to take place throughout the State Thursday, August 24th (the date of this writing). The outlook is for large and representative gatherings at many points. The sub-committee of the free coinage executive committee has issued several thousand petition papers, which have been circulated throughout this State, Colorado, Utah, Montana, Washington, Oregon and Nevada, and, when filled out, will be forwarded with the resolutions to Washington. In this city several hundred of the most prominent citizens, including bankers, merchants and professional men, have already willingly signed, and among the laboring class the number of signatures reaches into the thousands. One of the blanks was lately returned to the office of the committee that had been signed chiefly by men on Beale, Main, Mission and Howard streets. The sheets were somewhat soiled and across them were written, "Dirty hands with clean hearts; mechanics, engineers, foundrymen, millbuilders and laborers."

THOMAS A. EDISON, the inventor, announces that he has given up electricity and is now devoting his whole time to metallurgy. The recent attention of the great inventor had been directed to coal, from which he attempted to obtain electricity. While results were satisfactory for a time, he gave it up, for he said he could reach no important conclusion for at least several years. If Mr. Edison hereafter devotes his genius exclusively to the solution of metallurgical problems, miners and mining men may look for benefits of a permanent and very profitable nature. Possibly the chemical reduction of ores by some economical process may be achieved.

THE manager of the Anti-Debris Association has gone to Washington to watch any legislation that might come before the present session of Congress affecting the interests of the Sacramento valley. The attorney of the Association has been instructed to be present before the Debris Commission August 29th, when the application of the Kelly Hill Gravel Mining Company will be heard, and watch proceedings; and various functionaries in the employ of the association are still watching the abandoned hydraulic mines to see that there is no infraction of law. On the whole, the system of espionage inaugurated by these self-appointed guardians of the public interest seems to afford several very nice jobs for a number of deserving gentlemen who make a business of protecting the farmer for a consideration.

THE MINERS OF SHASTA COUNTY have been appealed to by the county fair commissioners to furnish quartz specimens for exhibit at the Midwinter Fair. It is proposed to make the Shasta display as fine as any other. The example of Shasta might well be emulated in other mining regions. It seems certain now that the fair will be held, and it will be the greatest event of the kind ever attempted west of the Mississippi river. The fair managers are being well supported by the people of San Francisco, though outside counties have as yet done little or nothing. Considerably over $300,000 has been raised, and doubtless the $500,000 mark will be reached. The managers will then be justified in laying their plans on a million-dollar basis. Ground will be broken probably next week.

MATTERS are improving in Denver. A majority of the banks which went down in the recent crisis have resumed, and it is expected that the remainder will start up by September 1st. Many idle men have been given work on city improvements, and the unemployed population has in other ways been materially reduced. Denver will in course of time assume its former place as one of the most active, enterprising and prosperous towns of the West. The elements of wealth are there, for the mineral resources of Colorado are enormous. Silver will not always be in the dumps. The State can easily increase its gold output. Its people are buoyant, generous, courageous and undismayed. The future is all theirs.

Tailings.

JOHN MCNALLY, of San Francisco, is to succeed George Barman as superintendent of the Virtue mine, near Baker City, Oregon.

COLONEL W. J. SULLIVAN, general manager of the great Candelaria and Holmes silver mines, Candelaria, Nev., has returned from London, after nine months' absence.

SECRETARY HOKE SMITH has decided that he has no authority to lease land on the Uncompahgre reservation, Utah, containing asphalt deposits. They must be restored to the public domain before they can be leased.

GEORGE P. KIRK, a prospector, formerly of San Francisco, shot and killed one Anderson, his partner, May 26th, at Tumgau, Alaska, 1200 miles from Sitka. Kirk says Anderson attempted to run away with their boat and provisions.

THE Enreka Granite Company, of which Ira P. Allen is president, at Rocklin, have just closed a contract with the trustees of the Stockton Library Association to furnish granite for the foundation and about eight feet of the first story of their new library building.

ABOUT September 1st an English company, together with several home capitalists, including Wilbur & Chandler and A. Caldwell of Riverside, and L. C. Moreland, will begin working the placer claims about 15 miles above Yuma, on the California side of the Colorado river.

THE Grass Valley *Tidings* believes it would be a good plan for some of the Gress Valley mining companies to have their stock listed on the San Francisco stock board. If properly managed, such a proceeding would doubtless aid development work and increase the output of the district.

JOHN BURKE, well known all over Idaho, Oregon and Washington, has been in Portland arranging to work a gold mine he has just invested in in southern Oregon. The machinery for the stamp mill will be shipped soon, when he, with one or two other associates, will leave for the scene of operations.

STOCKHOLDERS of the Minnie Mining Company, Gress Valley, have elected the following directors: Samuel Yeo, I. Haas, Samuel Granger, Jas. Bennallack, Frenk Snell. The board has organized by the election of I. Haes as president; Samnel Yeo, vice-president; Jas. H. Bennallack, secretary; Watt & Co., treasurer.

CHARLES S. RICHARDSON has left Gress Valley for Lowell Hill, where he will take charge of the Planet drift gravel mine. In connection with a number of men from below, he has a bond on the property, which is owned by Grass Valley people. It is Mr. Richardson's intention to put about ten men at work on the mine.

ARTICLES OF INCORPORATION have been filed on behalf of the Morning Star and Trenton Milling and Mining Company, for the purpose of carrying on gold and silver mining in Plumas

county. Directors: James T. Landregan, Thomas C. Landregan, Philip Monroe, C. H. Spear, E. A. Holman. Capital, $50,000, folly subscribed.

ORDERS have been issued by the Treasury Department to all sob-treasuries to pay out gold over the counters the same as other classes of money. The effect is to practically place the gold reserve among available Treasnry cash assets. As a resnlt tbe gold balance is somewhat reduced, being slightly below $100,000,000. The net treasnry balance is $11,750,000.

THE Rocklin Granite Co., Placer county, which has been awarded the contract for the stone work on the Lick monnment, has been working upon the contract for several days, says the *Representative*. The granite work will amonnt to a little over $17,000, the entire monoment, when completed (including elaborate bronze work, etc.), to cost $100,000.

NEARLY the entire amount of worn fractional money in the Federal Treasury and various sub-treasuries can be recoined if Congress makes the appropriation of $300,000 recently asked for in a special letter by Secretary Carlisle. The shrinkage of the nominal value of these coins has averaged about three per cent, and the appropriation asked for would cover the loss on $10,000,000.

C. W. HEYER writes to the Winnemucca *Silver State*: "I have traveled many miles and have fonnd no more favorable camp than Kennedy district, in this State, and predict in its near future a prosperons camp. Bnt yon have got to get redncton works there, snch as a mill. As an old miner and furnace man, I would prefer a furnace, especially as the conntry affords all the facilities to get charcoal, floxing, etc."

ARTICLES OF INCORPORATION have been filed on behalf of the Star of India Consolidated Gold Mining Company, for the pnrpose of working the mining properties sitnated in Angels mining district, Calaveras connty, known as the New York, California and Curiosity mines. The capital stock is placed at $1,000,000, and the directors are: Thomas Cole, Robert M. Atkinson, Joseph F. Cnrtis, N. W. Hendricks, J. A. Fairweather.

THE Mammoth Mining Company has filed articles of incorporation. The directors for the first year are: Add C. Hinkson, John F. Cooper, F. T. Van Fleet and J. A. Woodson, of Sscramento, and E. B. Thomas of Grass Valley. The capital stock of the corporation is $100,000, divided into 100,000 shares of the par value of $1 each. The principal place of bnsiness of the corporation is to be in Sacramento. The mine is located in Grass Valley township.

THE copper mines at Copperopolis, Calaveras connty, employing 300 men, were closed down last week. The men were paid off and are now seeking other employment. The tightness of the money market is given as tbe cause of the snspension of the work. The suspension of work hss paralized the business of the town, for everything depended on the mines for snpport. The mines are owned by Frederick Ames of the Union Pacific railroad and part of the estate of Oliver Ames. They were opened in the early '60's, but were idle for many years until five or six years ago.

"THE old Mexican methods of reducing ores is again springing into prominence in Inyo connty," said R. May, a mining man, the other day to a local reporter, "and a few new arrastres have been bnilt this snmmer. The one in onr district is generally refractory, but mnch of it can be worked by the simpler processes. Although the arrastre process is the simplest and cheapest on earth, I am convinced that Inyo county miners will soon close them down and wait until the silver market is relieved of the glut. There is barely a living in the white metal now, unless it is in the shape of four-bit pieces."

THE Mining Burean has received a very curious gift from Victoria, Australia, in the shape of some fossilized fruit. It was found at a depth of 100 feet in a gravel bed in which miners were drifting for gold. Usnally when vegetable matter is preserved it becomes changed by the gradual replacing of its parts with silicions matter. This frnit is carbonized and shows all the lines of the fiber, the meat, the skin and the pit perfectly. What makes the matter more pecnliar is that there are no trees of any sort in the whole sorrounding conntry, nor is there any kind now found like that recovered from the gravel. The specimens were sent to the Mining Bnrean by W. E. Bnrbridge.

ARTICLES of incorporation of a new company to work the Jenny Lind and Godfrey mining claims have been filed with the Nevada Connty Clerk. The capital stock of the company consists of 100,000 shares, of the par value of $1 per share. Tbe directors of the new company are Wm. M. Treloar, C. H. Mills, W. F. Bowden, Arthur Powell and John F. Cooper. A great deal of work was done on the Jenny Lind in early days, but the mine was considered very dangerous, and when John Miners was killed in it all operations ceased. It is a gravel claim of a what is termed a "qnicksand" formation. The company proposes to work deep down, where the danger will practically be eliminated.

IN 1872 Snperintendent John Daggett of the San Francisco Mint was presented with a handsome silver service in recognition of the sale of the Black Bear mine in Siskiyou conntv. It was worth at least $2000, but the Daggetts were not keeping house at that time, and consequently the princely pieces were carefully wrapped, packed and sent to the manufacturers, Vanderslice & Co., for safe keeping. In 1885 the Daggetts called for their silver service, but it had disappeared. Litigation resnlted, and the case went finally into the State Supreme Court. The Daggetts lost. The other day, from an unfreqnented spot, the junior member of Vanderslice & Co. dragged forth a mnsty, spider-ridden, dust-begrimed hox. It was opened, and fonnd to be the long-lost silver set. Litigation has ceased.

COL. SULLIVAN, snperintendent of the Candelaria and Holmes mines, says that the chief obstacle in the way of resnming work is miners' wages. Says the Colonel: "We would resnme operations if the miners at Candelaria would come to me and say they were willing to work for abont $2 a day. I cannot go to them and ask them to do this, but if they would come to me I would pnt 300 or 400 of them at work, low as the price of silver is. This would not be the snm I woold pay them either as soon as silver began to improve. I would steadily raise the wages. In fact, I wonld rather pay $4 a day at $1.29, the price silver once was, than pay $2 now; I wonld make more money." It is not clear jnst what motives of delicacy restrain the Colonel from making his proposition to the miners; but, as he says he can't, no doubt he means he won't.

As to Assessment Work.

TO THE EDITOR:—Please permit me to send you a few remarks about assessment work, and my suggestions in that regard. The modus operandi in regard to assessment work now in force ($100 a year for each claim) is, in my opinion, a determent for the development and general interest of our mining affairs. Every mining man knows there are thousands of people who are holding mining claims without doing any assessment work. All they do is to post a notice of location and relocation, and in that manner keep away other men who, perhaps, would develop the property if it were not already located.

Therefore, I would propose that the now existing law in regard to assessment work be repealed, and that a new law should be enforced, so that parties who are holding mining claims, or take up new claims, pay $10 or more a year for each claim, to the county treasury. The treasurer should issue duplicate receipts for such payment. The miner who paid for his claim or claims should keep one receipt, and the other receipt he should post close to the principal notice of location on his claim for which payment has been made, so that any prospector can see, without losing time, if the holder of a claim has done his duty.

The receipt posted close to the principal notice of location should be of a distinct shape in form and color—easily distinguishable—and the date of payment executed in large letters; thus facilitating prospecting and being a guide for prospectors.

I think a similar law is in existence in Mexico, but I don't know if it contains the provision which I recommend as the most important factor; viz., the posting of the receipt close to the principal notice of location.

The payment of $10 (or more) for each claim already recorded at the date of enforcement of the new law should be made inside of one month of the date of enforcement of the new law, and the posting of the receipt should be done inside of one month of the date of payment; otherwise the claim-holder forfeits positively his right.

A prospector who locates a new claim must make payment at the same time he gets his notice of location recorded, which must be done inside of ten days from the date of notice of location; and inside of one month of the date of payment he must post the receipt for which payment has been made, otherwise he forfeits his right.

I recommend a payment of $10, so as to give the poor prospector a chance, although payment should be a little larger; but I am sure that the payment of only $10, strictly enforced, will do more good to the mining interests in general than the law at present in force.

Many years ago I knew a fellow who located in one week more claims than hairs on the convex surface of his brainpan, and he never prospected, worth mention, one claim. Such fellows are a nuisance in any mining country, and could be easily defeated by establishing a law, which I recommend.

The new law should be enforced at a season when weather will permit the claim-holder to go to his claim and post the receipt for payment on to the principal monument. The provision now in existence, in regard to a patent, should be sustained; because, if a claim-holder can prove that he invested $500, or more, he should get an equivalent for his money invested.

If you find my suggestions worth any consideration, I am sure you will put your shoulder to the wheel, and help to repeal a law which does not fill the bill. C. R A.

Portland, Or., July 30, 1893.

The Mines of Grass Valley.

TO THE EDITOR:—The mining interests of this section seem to be in a more flourishing condition at the present time than they have been for some years past. Twenty-five mines and prospects are being worked, so I am informed, within a radius of three miles of Grass Valley. In the past week I have visited a large number of the mines and prospects in this section and found the most of the developed mines working a full force of men. The W. Y. O. D. (Work Your Own Diggings) and Empire mines, which are situated near each other, are running to the full capacity of their mills on a good grade of ore.

The famous Idaho mine which has been one of the great gold producers of the Pacific slope, is situated about a mile from town. This mine is also one of the deepest-worked gold mines in the United States, having been worked to a vertical depth of 2180 feet. Its production exceeds $11,500,000 up to the present time. The Maryland, which is an extension of the Idaho, is now being opened up and worked through the old Idaho shaft and a large force of men are employed in the mine. The North Star, one of the largest mines in the district, is also running full blast. The Omaha and Lone Jack, situated on Boston Ravine, are now consolidated and are being worked in connection with each other.

New hoisting works are being erected on the old Granite Hill mine preparatory to opening up the mine again.

The Osborn Hill Mining Company, of which Wm. C. Ralston, secretary of the Miners' Association, is president, is opening up the Old Osborn Hill mine. The most profitable results are looked for in the near future from this and the Centennial, and, in fact, all of the properties in that group.

The Crown Point is at present idle, the machinery being insufficient to handle the water in the mine, but Mr. Gauthier, the proprietor, intends putting in new machinery soon with ample capacity to work the mine on an extensive scale.

Although the mining industry is more active in this locality at present than anywhere else on the coast, still I hear that never-ceasing cry of hard times and lack of money at every turn. The mines of this district are among the richest on the coast, and in a year or two more, if the development of mines continue in this district like they have in the past few months, Grass Valley district as a gold producer will take the lead of any district in the United States. The ledges, although small, are of high grade ore and they exist in formations which invariably insure permanency and great depth. ALEX. QUARTZ.

Grass Valley, Cal., Aug. 19, 1893.

Ecuador Mines in Straits.

John George, the machinist, has returned to Grass Valley from South America, where he went last March to take a position in the Playa D'Oro mines in Ecuador. The mines are situated about 120 miles from the coast and 100 miles from Quito, the capital of Ecuador. Mr. George left Ecuador on the 10th of July, arriving in San Francisco on the 14th of August.

In conversation with a *Tidings* reporter, Mr. George stated that none of the glowing promises that were made to him, and the rest of the Nevada Countyans who accompanied him, were fulfilled. They were promised $4.50 per day, but have not received any wages for two months, probably on account of the financial stringency in New York. Capitalists there are largely interested in the mines and they have not been able to send any money down, consequently the miners have not been paid. The mines are on low ground and are utterly worthless. They were worked about 150 years ago by the Spaniards, who realized very little out of them. Provisions are very high, pork costing 40 cents per pound and flour 10 cents. The provisions have to be brought a distance of 60 miles through almost impassable forests in which the trails have to be cut with hatchets as the traveler progresses, and up rapid rivers where the progress is naturally slow. At the time Mr. George left, the stock of provisions was getting very low.

Three pipe-makers had been taken down to manufacture 30-inch hydraulic pipe to work the mines, but as the iron was tied up in San Francisco awaiting payment, the pipe-makers had nothing to do. Mr. George was informed by a letter from San Francisco of the state of affairs, and succeeded in getting money enough from the officers to come home. The climate is very hot and very wet, rain falling every 24 hours, and altogether Mr. George concludes that it is a very good country to keep away from. Nevada Countyans still there are Vic Blodgett, Jas. Petersen, Archie Patterson and Ed Ryan. They will be sent home at the earliest opportunity.

The Bland Free Coinage Bill.

The full text of the bill introduced by Congressman Bland, of Missouri, is as follows:

"Be it enacted, etc., That from and after the passage of this act all holders of silver bullion to the amount of $100 or more, standard weight and fineness, shall be entitled to have the same coined at the mints of the United States into silver dollars of the weight and fineness provided for in section 2 of this Act.

"Section 2. That the silver dollar provided for in this Act shall consist of 412½ grains of standard silver, said dollar to be legal tender for all debts, dues and demands, both public and private.

"Section 3. Holders of silver dollars herein provided for shall be entitled to deposit the same and receive silver certificates in the manner provided by law for the standard silver dollar.

"Section 4. So much of the Act of July 14, 1890, as requires the monthly purchase of 4,500,000 ounces of silver shall be and the same is hereby repealed."

The Stewart Silver Bill.

The silver bill introduced by Senator Stewart, of Nevada is as follows:

"Be it enacted, etc., that the fourteenth section of the Act of January 18, 1837, be and the same is hereby re-enacted, which reads as follows:

"That gold and silver bullion brought to the mint for coinage shall be received and coined by the proper officers for the benefit of the depositor, provided that it shall be lawful to refuse at the mint any deposit of less value than $100, and any bullion so base as to be unsuitable for the operations of the mint, and provided also that when gold and silver are combined, if either of the metals be in such small proportion that it cannot be separated advantageously, no allowance shall be made to the depositor for the value of the metal."

The second section repeals the silver-purchase clause of the Sherman law of 1890.

SPEAKER CRISP on Monday announced the membership and chairmen of the various house committees, several of the most important are as follows:

WAYS AND MEANS—Wm. L. Wilson of West Virginia, Ch., McMillin (Tenn.), Turner (Geo.), Montgomery (Ky.), Whiting (Mich.), Cockran (N. Y.), Stevens (Mass.), Bryan (Neb.), Breckenridge (Ark.), Bynnm (Ind.), Tarsney (Mo.), Reed (Me.) Bnrrows (Mich.), Payne (N. Y.), Dalzell (Penn.), Hopkins (Ill.) Gear (Iowa).

COINAGE, WEIGHTS AND MEASURES—Rd. P. Bland of Missonri, Ch., Tracey (N. Y.), Kilgore (Texas), Epes (Va.), Stone (Ky.), Allen (Miss.), Bankhead (Ala.), Raynor (Md.), Carter (Ohio), Coffeen (Wy.), McKeighan (Neb.), Stone (Pa.), M H. Johnson (N. D.), Dingley (Me.), Sweet (Idaho), Hager (Iowa), Aldrich (Ill.), Rawlins, (Utah).

BANKING AND CURRENCY—Wm. M. Springer of Illinois, Ch., Sperry (Conn.), Cox (Tenn.), Cobb (Mo.), Culberson (Texas), Ellis (Ky.), Cobb (Ala.), Warner (N. Y.), Johnson (Ohio), Black (Ga.), Hall (Mo.), Walker (Mass.), Brosius (Pa.), Henderson (Ill.), Rossell (Conn.), Hangen (Wis.), Johnson (Ind).

MINES AND MINING—Thos. A. E. Weadock of Michigan, Ch., Sipe (Pa.), Tate (Ga.), Ikirt (O.), Richardson (Mich.), Cockrell (Texas). Baker (Kan.), Stephenson (Mich.), Shaw (Wis.). Newlands (Nev.), Cousins (Iowa), Lilly (Pa.), Rawlins (Utah).

Bluing Copper Solution.

Mr. G. F. Beardsley, metallurgist, formerly of Melrose, Cal., contributes to the *Australian Mining Standard* an article on the use of sodium carbonate for bluing the copper solution in the cyanide assay. Mr. Beardsley says:

A few weeks back it became necessary for me to make quite a number of copper assays of the Monnt Lyell copper ore, and the products and residnes of a test smelting of the same. All assayers are familiar with the fact that the indirect assay of copper by means of an acid solution of that metal made blue by an excess of ammonia, and titrated with a standard solution of potassium cyanide, is by far the qnickest and the neatest, and also that it is subject to many sources of error. A number of careful assayers bave devoted much time and trouble to the reduction of these, the most notable of which are the researches of Messrs. Torrey and Eaton (see *Mining and Engineering Journal*, May 9 and June 6 and 27, 1885). One of the sources of error is the indiscriminate use of the acid and ammonia, which, to a great extent, is got around by using a measured quantity of both, bnt still the results are not exact.

In looking over what literature was obtainable on the subject, attention was attracted by an article on "The Volumetric Analysis of Copper" (*Mining and Engineering Journal*, May 30, 1890), which recommends the use of sodium bicarbonate instead of ammonia for bluing. This authority states that no matter what variation is made in the amount of the reagents used, the results are the same, provided there is a slight excess of nitric acid above what is required for the solution of the copper, which condition is always present; also that the blue is more persistent and the end reaction consequently much sharper. All this is fully borne out in the working of the method. As I do not know of the method appearing in any text book on assaying, the following is submitted. Duplicates agree well with each other, but there has been no checking by any other method.

Assay: The ore should be triturated very fine in the agate mortar. Use one gramme or ten grains. Diffuse in a few drops of water in a covered casserole. Treat with 10 c. c. dilute nitric acid (two of acid to one of water). Heat very gently (below the boiling point) until active action has ceased, then evaporate slowly to dryness without removing the cover. The sulphur, if there is any left, should be in one or two yellow buttons; if not, remove on a strip of platinum foil, burn, and dissolve off with a drop or two of nitric acid. Add hydrochloric acid and evaporate the greater bulk of the acid. If silica is present and is to be determined, evaporate to dryness.

There are two methods of separating the copper from the iron, etc. First by precipitation by hydrogen sulphide as sulphide of copper; second by precipitation on zinc as metallic copper.

If the first method is used, dilute, filter, make up about 50 c. c., and heat to boiling. Pass a rapid stream of sulphuretted hydrogen gas through the solution; the solution should contain at least 5 c. c. free hydrochloric acid. Allow to settle a few minutes, filter, wash well with hot water to which a little sulphuretted water has been added. After washing into the point of the filter, remove the filter and its contents from the funnel, open and spread it on the hand and wash the precipitate off with a stream from the wash bottle into a casserole. Add 10 c. c. nitric acid, put the cover on the casserole and evaporate nearly to dryness. There will be two or three small beads of yellow sulphur, which may be ignored. Wash out of the casserole into a beaker and blue the solution by adding a sufficient amount of a cold saturated solution of sodium bicarbonate. If there be not much free nitric acid left from the last evaporation, this will amount to 100 or 150 c. c. for anything under 10 or 12 per cent copper. More copper requires more soda solution. Upon the first addition of soda the copper is precipitated as a carbonate, but upon further addition the precipitate re-dissolves and the solution becomes clear, though of a much lighter color than when blued by ammonia. The solution is now ready for titration by the cyanide solution.

If the second method for the separation of the copper is used, sulphuric acid is added and the solution evaporated until white fumes of sulphuric acid are given off. There should be but little or no free acid left. Dilute with water and filter from the silica. Everything in the casserole must be dissolved by the water except the silica, barium sulphate, etc.; undissolved basic salts retain considerable quantities of copper. Immerse in the filtrate a clean strip of sheet zinc three inches long and one-half inch wide. If the action of the solution on the zinc is too violent, dilute the solution with cold water. When the copper is all precipitated, which may be tested by immersing the point of a clean knife blade in the solution, add a little more sulphuric acid to dissolve the balance of the zinc. When this has totally disappeared, wash the precipitate several times by decantation. Dissolve the copper in a few drops of nitric acid, blue with the soda solution and titrate.

One very noticeable thing during the titration is the changing of the color of the solution from a pale blue to a very deep blue immediately upon the addition of a very small portion of the potassium cyanide solution.

In preparing the copper solution for the purpose of standardizing the cyanide solution, care must be taken not to have the copper go beyond one-half milligram to the cubic centimeter of sodium carbonate solution. In a solution of 1 m. g. copper to 1 c. c. soda solution there slowly separates out crystals of artificial malachite ($CuCO_3+Cu(OH)_2$).

Great Velocity of Projectiles.

A Washington dispatch, August 18, says: At the United States proving grounds on Sandy Hook this afternoon the army ordnance officers broke the record in the United States for velocity of projectiles. Experiments were made with a Brown segmental wire gun which has a bore five inches in diameter and a length of nineteen feet. The powder used was the new but already celebrated Leonard smokeless powder.

Fifteen shots in all were fired, beginning with a charge of only seven pounds and increasing gradually to twenty pounds. The seven-pound charge gave the projectile a muzzle velocity of 1720 feet per second, which cannot be equalled by any similar charge of any other known powder, but the last shot was the record breaker.

A charge of twenty pounds of Leonard smokeless powder projected the elongated cannon ball, weighing 62 pounds, at a muzzle velocity of 2865 feet per second. The experiments were conducted by Lieutenant G. N. Whistler of the Fifth United States Artillery, in the presence of other ordnance officers, J. H. Brown, the inventor of the segmental gun, and Mason E. Leonard, inventor of the smokeless powder.

Rats in a Silver Mine.

The first rats were brought to the Comstock from California in freight wagons, principally, most likely, in the big "prairie schooners," stowed away among boxes and crates of goods. Their rapid increase, after their first appearance on the Comstock, was astonishing, says the *Engineering Journal*. From 10 to 14 young are produced at a birth, and there are several litters each year; besides, a rat is a great grandfather before he is a year old. Then, the rats that colonized the Comstock towns encountered no enemies. There were no cats in the country.

Soon stores, barns, warehouses, hotels—the whole town—were swarming with rats. Cats were then brought over from California, and the first lot sold for $20 to $25 per head. Soon every prairie schooner that crossed the mountains had slung to it a big cage filled with cats of all colors and kinds. The price went down to $10, then to $5 a head, and finally so many cats arrived that they could not be given away.

For some time, however, crates and cages filled with cats—or what was left of them after fighting all over the mountains—continued to arrive, and, no sale being found for them, they were turned loose in the town. Soon the whole place swarmed with cats, and the cat nuisance was worse than the rat nuisance, and it was a thousand times more vociferous.

The rats soon discovered the mines and found therein a congenial home and a home free from the terrifying presence of members of the feline tribe. Never was a cat seen in any of the lower levels of the mines, though they sometimes prowl about the surface of the tunnels. In the first opening of the mines there was no place for the rats, but as soon as the timbers began to be set up and cribs of waste rock built they were able to find safe hiding places; also there was room for them everywhere behind the lagging of the drifts. As they increased in numbers there was on all sides an increase of space through the rapid extraction of ore by the miners.

They doubtless soon discovered that, though man was their enemy on the surface, he was their friend down in the underground drifts and chambers. He shared his meal with them, and they scampered and capered about him with perfect impunity. The warmth of the lower levels appeared to be very congenial to the rats, both old and young. Cold is a thing unknown to them. It is as though they had been given an immense hothouse in which to breed. Any temperature they desire, from 60 degrees to 130 degrees, is at their command. Rats are useful as scavengers in mines. They devour all the scraps of meat and other food thrown upon the ground by the miners while at lunch, eating even the hardest bones, thus preventing bad odor. As the decay of the smallest thing is unendurable in a mine, the miners never intentionally kill a rat.

The miners have a high opinion of their sagacity. The rats generally give the miners the first notice of danger. When a big cave is about to occur, they are seen to swarm out of the drifts and scamper about the floors of a level at unwonted times. The settling of the waste rock probably pinches the animals in their dens, causing them at once to leave in search of less dangerous quarters.

At times, when a mine has been shut down for a few weeks, the rats become ravenously hungry. Then they do not scruple to devour the young, old and weak of their kind. During the suspension of work in a mine that is not connected with other mines that are running, everything eatable in the underground regions is devoured, even the candle drippings on the floors. When work is resumed, the almost famished creatures are astonishingly bold and fearless. Then they will come out of their holes and get upon the underground engines (even when they are in rapid motion) and drink the oil out of the oil cups, quite regardless of the presence of the engineers.

A fire in a mine slaughters the rats by the wholesale. Few escape, as the gases penetrate every nook and cranny of the underground regions, and often so suddenly as to asphyxiate them in their homes.

Dividend-Paying Mines.

The *Mining Review* publishes a list of 81 incorporated dividend-paying mines in the United States, of which 37 are in Colorado, 11 in Montana, 8 in Nevada, 8 in Michigan, 5 in Utah, 4 in California, 3 in Idaho, and others scattered. The greatest amount of dividends has been paid by the Calumet and Hecla copper mine in Michigan—nearly $39,000,000. Next comes the Ontario mine of Utah, with $14,000,000 of dividends, followed by the Granite Mountain Company of Montana, with $12,000,000. These are now the great paying mines of the country, though, of course, they have not produced the amount of bullion which the Consolidated Virginia did in the days of its glory. But the longest record of dividend payments is held by a California mine, the Idaho mine of Grass Valley, which has paid 256 dividends, aggregating $5,450,250.

California Stamps in Cornwall.

At a recent mining meeting in Cornwall, Capt. Josiah Thomas, the manager of the Dolcoath mine, read a paper descriptive of the Californian stamps recently introduced by him into the county, says the London *Mining Journal*. He said the Cornish stamps, almost universally used throughout the county for stamping tinstuff, were known as "gravitation stamps," the work done depending mainly on the weight of the heads and the height they were lifted. The new Californian stamps recently erected at the Dolcoath mine were also gravitation stamps, but were constructed on a different principle. The heads and lifters were round and made to revolve, the lifters, three inches in diameter, working in teak and wood guides. The heads were fitted in the bottom with cast-iron shoes, of about 1¼ cwts. each, which take all the wear, so that there is practically no wear in the heads themselves. There were at present 40 heads at work at Dolcoath, but the steam engine was of sufficient power to drive an additional 40 heads. There were eight iron coffers with five heads in each, arranged in four batteries of ten heads each, driven off the main shaft by a separate leather belt to each battery. Cams lifting the heads twice to a round are fixed on a cam shaft five inches in diameter, and there was a separate finger or "jack up" provided for each lifter, so that each coffer can be quickly stopped for repairs or renewals when required without interfering with the working of the remaining stamps. The falling weight of each head was 800 lbs., set to drop nine inches, and run at a speed of 80 drops per minute. The gate is 15 by 45 inches, and has 132 holes to the square inch. The engine was of the modern girder type compound horizontal and jet-condensing, coupled at right angles with heavy fly-wheel between. The chief advantages of the Californian stamps over the Cornish stamps are that the steam is worked at 100 lbs. pressure instead of about 40 lbs., so that the engine works much more economically. The cam stamps shafts, with cams for lifting the heads, not being more than about one-fifth the weight of the huge iron axles and cams in the Cornish stamps for a similar output, a much less power was required to turn the axles. The heads being circular, and revolving at every lift, they wore much more evenly and consequently did much more effective work. The wear and tear of the heads and lifters and of most of the working parts of the stamps was much less than in the old stamps, and the friction was also considerably lessened. Much less time was occupied in changing the heads and in stopping for repairs. The consumption of fuel as compared with power shown by indicator diagrams was 2 38 lbs. of coal per indicated horse-power per hour, being equal to a duty of 70,000,000 lbs. lifted one foot high by the consumption of 112 lbs. of coal. The output of tinstuff of ordinary size and hardness was about two tons per head in 24 hours when the stamps were kept fully at work, the consumption of coal being 39.27 cwts., or nearly two tons, for the 40 heads. This was about twice as much stuff per head as was stamped by the average Cornish stamp, with about the same quantity of coals. The whole of the plant at Dolcoath was supplied by Messrs. Harvey & Co. of Hayle. It was ordered on June 13, 1892, and, together with the dressing floors, was completed and set to work on November 28, 1892. In conclusion, he stated that several mining agents who had worked similar stamps to the new ones at Dolcoath in other parts of the world had told him they would rather pay for the Californian stamps than have the others for nothing. At first he received those statements with incredulity, but from the experience he had already had of the Californian stamps he did not think those agents were very far wrong in their opinion. (Applause.)

Mr. E. G. Heard asked whether Capt. Josiah Thomas could tell them where the stamps were invented, and why they were called Californian stamps.

Capt. Thomas replied that it had been stated that they were worked first in Cornwall 40 years ago. (Laughter.) He gave that on the authority of Messrs. Harvey & Co. of Hayle. After that the stamps were introduced into California and considerably improved in all their working parts. When in Dakota he saw on a large gold mine 700 heads of stamps crushing more stuff than was raised in Cornwall every day, and the managers told him they intended erecting more Californiao stamps in order to crush 4000 tons of stuff every day. (Hear, hear.)

Mr. Hicks, Redruth, while admitting Cornishmen were the best miners in the world, stated that they were not good mechanical engineers, and, as a consequence, companies who required men to manage their mining properties were going elsewhere to obtain them.

A Mine Long in Litigation.

The case of Purcell et al. vs. Heald et al. is an action to quiet title to the Rising Star quartz claim, which is located in the Plymouth mining district, east of the Indiana and contiguous thereto. The Indiana is part of the mining property of the Plymouth Consolidated, and hence is supposed to be valuable, says the Amador *Ledger*.

The claim was purchased in June, 1877, by Ed Purcell, Pat Purcell and James O'Brien, under the name of the Rising Star Gold Mine. In June, 1879, Sell, Bridge et al. also located the same property, calling it the Montezuma mine, and organizing the John Gold Mining Co. In 1880 suit was instituted by the Rising Star claimants against the John Gold Mining Co. to quiet title. The case was called by the court and dismissed without prejudice. The tragic events of the affair occurred in 1880, when the John Gold people tried to resume operations they had commenced in 1879, and were driven from the property by James O'Brien and Thomas Higgins.

In 1881–2–3 the Rising Star Co. did assessment work on the property, and in 1883 or the early part of 1884 they had a falling out among themselves, with the result that on

December 1, 1884, Higgins recorded a notice of location on the property, calling it the Red Oak. He went to work on the 2d of December without having posted notices upon the claim and gave to Pat Purcell's wife and to James O'Brien's wife a one-quarter interest each in the claim. Ed Purcell and R. D. Reeves, who had become an owner, knew nothing of Higgins' location until January, 1885. In February, 1885, C. B. Armstrong, now deceased, was given a one-fifth interest with the original locators, as an attorney's fee, and in the same year Higgins was cited to appear at the Land Office at Sacramento. He did so, as did also the other claimants. The Register and Receiver of the Land Office sustained Higgins' location, and the Rising Star took an appeal to the Land Office at Washington. Here the John Gold Mining Co. was shut out, as it perfected no appeal. The decision at Washington was that the matter must be settled in the local courts. In 1885 Heald of Nashville became interested with Higgins as financial backer of the enterprise, and hence the suit which was commenced is entitled Purcell et al. vs. Heald et al. The case has been before the courts at various times, but from one cause or another has been postponed, and went to trial again on Monday. The case is being tried before Judge Davis.

Ships Building for the Navy.

A press dispatch from Washington gives the following details in regard to the war vessels now under construction for the United States Navy. Ships in various stages of construction are as follows:

Name.	Class.	Tons.	Months to complete.
Montgomery	Cruiser	2,000	4
Marblehead	Cruiser	2,000	6
Cincinnati	Cruiser	3,183	6
Raleigh	Cruiser	3,183	6
Columbia	Cruiser	7,350	9
Olympia	Cruiser	5,500	8
Maine	Armored cruiser	6,648	4
Texas	Battleship.	6,300	10
Kalahdin	Ram	2,183	12
Massachusetts	Battleship.	10,200	24
Indiana	Battleship.	10,200	24
Ericcson	Ferryboat.	120	6

There are still on the stocks, in various stages of completion, the following vessels:

Name.	Class.	Tons.	Months to complete.
Oregon	Battleship.	10,200	30
Iowa	Battleship.	11,296	36
Brooklyn	Armored cruiser	9,150	36
Minneapolis	Cruiser	7,350	24

An appropriation was made last March for three gunboats of 1200 tons each, and designs are now being prepared in the bureau. Plans for four second-class torpedo boats to be carried by the Maine and Texas are also in preparation. The Puritan, Amphitrite, Terror and Monadnock are approaching completion at the navy yards. Work has been carried on on these vessels since 1888, and that they have not been completed long ago is because the armor contractors have not delivered the material.

Cableway Sketches.

The Lidgerwood Manufacturing Company has issued from its headquarters at 96 Liberty street, New York, the sixth of its series of sketch-books. It bears the title, "Cableway Sketches," and contains 64 pages of valuable information regarding cableways, tastefully illustrated by a number of deftly executed pen and ink sketches and several fine half-tone engravings—probably 50 illustrations in all. A portion of the matter contained in the last sketch-book, "Open Pit Mining," is reproduced in "Cableway Sketches," treating as it does of a very important branch of cableway service. With this exception, the pamphlet is wholly devoted to the construction of dams and the operation of quarries, using the Lidgerwood cableway. The Sodam, Austin, Butte City and Coosa dams are profusely illustrated, different stages in their construction being shown. Several views are also printed illustrating the great advantage of the cableway for stripping quarries as well as for general quarry use. The longest cableway ever sold for quarrying was 1200′ span, load ten tons. The heaviest weight handled up to the present time is twelve tons on an 800′ span. "Cableway Sketches" is intended for free circulation, and copies of it may be had by addressing the Lidgerwood Manufacturing Company of New York, Boston, Chicago, St. Louis, Pittsburg or Portland, Or. The pamphlet reflects credit on all interested in its preparation and publication.

The First News of Gold.

Charles Halleck contributes an interesting bit of history to the *Post* of Washington, being another episode of the California gold discovery. Mr. Halleck was informed of the incident by Capt. John Wilkinson, who, in 1848, was sailing-master of the sloop-of-war Saratoga, commanded by Captain D. D. Farragut. While the Saratoga was lying at Sacrificios, off the coast of Mexico, in April of that year, she was hailed one dark night by a launch, and the party being duly admitted on board proved to be the *ci devant* Midshipman Beale of California (afterward General E. F. Beale), who had just crossed Mexico, disguised as an English lieutenant, bringing the first specimens of gold from the new El Dorado.

Up to that time the discoveries on the Pacific Coast had not been made known, and it was the report brought by Beale which stimulated the gold fever all over the country and laid the foundation of San Francisco and of his own financial success. It was a feat of great daring to cross such an uncharted country as Mexico, while still writhing under the bitterness of defeat after the close of the Mexican war, when Americans so recently drew reprieves of life by the chances of a lottery in which black and white beans were the arbiters of destiny.

The Effect of Lichens on Trees.

[The following paper by Samuel J. Holmes of the University of California was recently read at a meeting of the State Horticultural Society. It relates to the growth on the bark of trees which is commonly termed "moss," and is thus of direct interest to orchardists, especially in regions near the coast where this growth is greatest. It has long been a question whether the moss was injurious or not, and Mr. Holmes' investigation shows that clean trees are the proper trees to grow.]

A New Subject.—The effect of lichens on trees is a subject which, we believe, has never been thoroughly studied. We have not been able to find more than a passing remark on the subject in any of the literature to which we have had access. The attention of botanists has been devoted to the morphology and physiology of lichens themselves, without much reference to their relations to their hosts. They certainly have not regarded them in the light of serious enemies to the trees on which they live. They are generally held to be epiphytes, or air plants, the bark of the tree forming the substrate for their support.

Throughout the damper portions of California, where the fruit trees become thickly covered with lichens, they have been regarded by the fruit-growers as a serious pest. Much money and labor are expended to clean the trees of these foreign growths. It is certainly a fact that trees that are badly overgrown with lichens are apt to be lacking in vigor. This, however, is not conclusive evidence that the lichens are the cause of the phenomenon, although it strongly supports this conclusion. Dead trees are generally covered more thickly than live ones, thus showing that the lichens are not dependent for their support upon materials that the tree elaborates. On comparing the dead twigs with the live ones on the same tree, the lichens will be found to be the largest on the dead twigs. This may be because the lichens are parasitic and have killed the twigs or because they are saprophytic and thrive best on the bark which is most decayed. Entire parasitism is out of the question, for the parasite in that case would die when its host died, but there is nothing against the supposition that the lichens are partially parasitic. This would account for less vigor of the badly infested trees and the fact that the lichens continued to live after the death of their host. Another reason might be brought forward to account for the greater prevalence of lichens on sickly or dead trees. The bark of thrifty and vigorous trees is generally brighter and smoother than the bark of sickly ones, and the spores of lichens would find less chance of attachment. This is probably the reason why smooth-barked trees, like the cherry and apricot are almost entirely free from lichens, while the rough-barked oaks and soft maples are often thickly overgrown with them.

How Lichens Grow.—The character of the bark is an important element in determining what species of lichens will grow upon it. Our common lichens will not thrive well on the bark of pines and cedars, though there are some species of lichens which are peculiar to those trees. There are lichens which grow upon mosses, and there are others which are peculiar to other species of lichens. These facts point strongly to the conclusion that lichens derive their support, in part at least, from their substrate. A further argument in the same direction is the fact that lichens often contain a large percentage of mineral matter. The only other source of the mineral constituents beside the bark is the dust which always collects more or less around their base; it seems more probable that the minerals were derived from the bark than from this source.

The Method of Investigation.—The foregoing facts are not conclusive evidence of the injurious effect of lichens on trees. In order to gain further light upon the subject we began a study of the method of attachment of the lichen to the bark. The bark used was that of the soft maple, which was overgrown with a foliaceous lichen, *Ramalina Menzresii.* Sections were cut through the point of attachment of bark and lichen, and examined by the microscope for evidences of local injury. In order to trace the course of the mycelium of the lichen, we tried several methods of double staining. Decidedly the best results were obtained with the aniline colors. About the only other stain that we found of service was acetic acid carmine. Sections were left in a strong solution for 24 hours and then slightly decolorized. The mycelium was tinged red, the cork cells remaining unstained. The action of the cork toward the aniline stains was peculiar and quite decided. We found that several of the stains would color it quite strongly and leave the lichen almost uncolored; others again would stain the lichen and not tinge the cork cells; others, as Bismark brown, would stain both bark and lichen uniformly. Picro-nigrosin stains the mycelium a very dark blue and the cork yellow. Aniline green colors the cork cells a bright green and the mycelium with brown. By combining different stains we were able to differentiate the cork and mycelium quite sharply. Aniline green (saturated solution in one per cent acetic acid solution in water) with an equal amount of picro-nigrosin, and aniline green and gentian violet, gentian violet and saffranin, are combinations which give good results. Sections were left in these stains 24 hours and decolorized.

On examining a section through the point of attachment of the lichen to the bark, it will be seen that the connection between the two is not superficial, but that the mycelium threads of the lichen ramify and intertwine themselves among the cells of the bark in the most intimate manner. The mycelium threads penetrate between the cells, loosen them from each other and gradually force them farther and farther apart. The cells thus come to be imbedded in the substance of the lichen, and as the lichen grows they are carried farther and farther away from their original positions. Having removed the superficial layers of cells of the bark, the lichen attacks those next beneath, and so on until it penetrates the entire thickness of the corky layer. The specimen shown and called Fig. 1 is a section across the base of a large lichen. All the superficial cells are surrounded by the mycellum threads, which have separated them from each other and are carrying them out. Farther out can be seen cells which have been transported quite a distance from their original situations. Often large groups are surrounded by the lichen and drawn up into its substance. It is usual to find under a large lichen a hole through the entire corky layer, which has been excavated by this process. This is probably the cause of the gap in the layer of cork in Fig. 1.

Specimen shown as Fig. 2 is a section a little to one side of the middle of the attachment of a lichen. It can there be seen how several layers of cells are being carried outward. This stage shows the beginning of what subsequently would become one of the holes through the cork at the base of the lichen. All stages can be traced from this the conditions shown in Figs. 1 and 5.

Specimen shown as Fig. 3 is a cut showing how the lichen has penetrated nearly if not quite to the growing cells. The mycelium acts as a kind of wedge, forcing the cells apart and growing deeper and deeper into the bark. The cells from the sides of the opening are being removed at the same time. In a short time a hole would be made here through the cork as deep as the live part. A hole having been thus excavated, it is continually enlarged by the same process of removing cells.

Specimen shown as Fig. 5 is a section through the base of quite a large lichen. The base is hollow—it being an old lichen—and the cells removed from the middle portion of the excavation do not appear. Cells are being carried away from the edges as well as the upper side of the bark. A large mass of cells on the left of the hole is being carried away entirely. Similar evidence of the removal of cells is to be seen in almost any section through the base of a lichen.

What is the Effect of This Removal of the Cells of the Bark?—An examination of the tissue below the point of removal shows us unmistakably that an additional production of cells occurs there to supply the place of the bark which has been removed. Specimen shown as Fig. 4 shows us what invariably occurs whenever the lichen has penetrated the center bark. We see, then, a hole that has been excavated through the regularly arranged cells of the cork and filled with the mycelium of the lichen. Immediately under this excavation we can see a triangular eminence of cork cells which have been produced there in great abundance to fill the gap and have caused the other layers to be tilted up. Fig. 5 shows under the edges of the old cork layer, which, being torn away, masses of cells which are forming to take its place. The break in the bark is not healed, however, for the new formation of cells becomes stripped off as the old layer was taken away. The process of removing cells and the production of new ones goes on continuously.

Specimen shown as Fig. 6 is a typical illustration of a quite common state of affairs under a lichen. It will be seen that the aggregate thickness of the disturbed layers of bark is much greater than thickness of the bark on either side. The spaces between these layers are filled by the mycelium of the lichen, which as they grow push the layers of bark outward. The interpretation of this section is, I think, that successive cork layers have been produced and carried out, the new bark forming as the old is carried away. As a new layer of cork is formed the mycelium threads of the lichen work their way through it, split it off and gradually push it farther and farther outward. A new layer forms under this and is carried out in the same manner. Successive layers having been thus formed and split off would bring about the condition shown in the figure.

How the Injury is Done.—The process by which a lichen injures a tree, then, is this: The mycelium threads pervade the corky layer of the bark, break it up and carry the cells outward. As a remedy for this, or, perhaps, as a result of the unnatural stimulation due to the presence of the mycelium threads, an extra growth of cork cells is produced at the point of injury. Now, the production of this additional amount of cork cells is plainly a tax upon the vitality of the tree. In the case of an exceedingly "mossy" specimen where the lickens are as thick as they can well grow, the effect upon the vigor of the tree must be great. It is common to find in situations where the air contains much moisture trees which are simply a mass of lichens as far as the new growth. The entire bark would be in that case in an unnatural and unhealthy condition, and it is no wonder, therefore, that such trees are often found to lack vigor.

Besides the mode of injury just described there are probably other modes by which lichens injure their hosts. The products of vegetable decomposition may accumulate under the lichens and may have an injurious effect. The retention of moisture forms decomposition, and any soluble materials thus produced and prevented by the lichens from being removed would work their way into the crevices in the bark along with the mycelium threads, and quite likely produce injurious effects upon the growing tissue.

We are not in a position to decide whether or not the lichens draw water from the living tissue. It seems very certain that they draw moisture from the outer bark and I see no reason why the transference of moisture from the inner to the outer bark would not take place by osmosis to compensate for that which is withdrawn by the lichen. If water be thus withdrawn the food materials which are dissolved in it must also be withdrawn and the tree must then suffer from a direct loss of nutritive material. In order to prove that a transfer of sap takes place we introduced coloring matter into the bark with the purpose of finding out whether or not it worked its way into the lichen. The coloring matter could get into the lichen only by being carried there by means of the water withdrawn from the growing tissue. Our experiments in this direction were incomplete and their negative results should therefore be given little weight. We hope to test this matter more thoroughly in the future.

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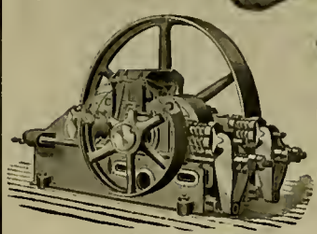

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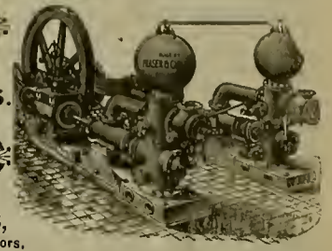

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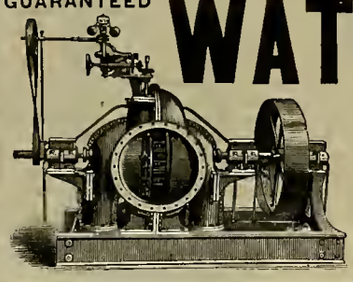

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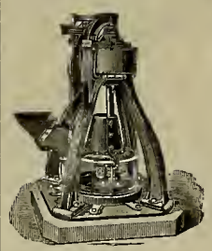

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Mechanical Progress.

Raising a Submerged Locomotive.

A very interesting mechanical feat has just been accomplished at Port Costa. On August 10th a locomotive weot driving on to the big ferry-hoat and failed to stop in time, plungiog nose-down into the turhid waters of Carquinez straits. The engineer and fireman jumped and were saved. The tender and cars remained on the ferry. The water was deep enough to bury the cab, but the ferry-boat was penned in at the slip. Elevating sunken engines is not a new thing, but in this case the locomotive stood bolt upright, and was sunk deep in the mud, making the task very awkward. Last Saturday night an immense shears of two long 12x12 inch timbers, crossed at the top, was raised on the edge of the boat, and immense pulleys were hung where the timbers crossed. Then a diver went down to fasten great cables on either side to the end of the steel framework under the boller. It took hours to get the powerful tackling ready for operation by four engines standing on the hoat ready to pull. A dredger was placed opposite, ready to pull with its steam winch. The first pull was made on Sunday evening, but with all the great cables, pulleys, engines, etc., the 80 tons under water would not budge. Cable after cable, nearly three inches in diameter, snapped, great chains broke, and things generally gave way when the engines started in to puff and pull. The big shears bent and the cables kept spl'ntering the cab under water.

At last the strength and power of the apparatus were douhled. Two more timhers were added to the shears, cables were hitched around the dome, over the boiler, and a fifth engine came on the hoat. The force worked all night, and at 7 n'clock Monday morning they were ready for another pull. It was calculated that the suction created in the mud added 40 or 50 tons to the weight of the engine, but the pulleys trebled the power and the five engines were practically made equal to 15 at work.

It was hard to get the engines to pull exactly together, and, as their wheels would slip and whirl, cables would keep snapping and the tackle generally would hend and crack and break.

During the forenoon a pull altogether started the 80 tons, and slowly the cab appeared above the water. At 3 o'clock in the afternoon the smokestack was just under water, and the giant engine was swinging in the air by great cables from the apex of the shears. When it was got a little higher, the steam winch in the dredger pulled the front end of the engine outward, the shears was slowly swung backward, and, while the five engines kept their grip on the swinging mass, it was swung backward over the deck of the steamer and then slowly lowered to the tracks it had left and finally hauled away to the little roundhouse there, where a hose washed a ton or so of mud from the disreputable-looking thing, which, however, was more defiled than damaged by its aquatic experience.

Malleable Iron vs. Cast Steel for Couplers.

At Chicago there were many steel couplers, but only four hrands of cast steel represented, and two special hrands of malleahle iron stood the test hetter than three of the brands of steel. Three of the four brands of steel gave quite bad results. Both of the special brands of malleable iron gave excellent results. At Altoona four brands of steel were entered. Two brands stood the test and went far heyond it. The other two brands were very ordinary, and did not average as well as the two special brands of malleable iron. The averages are as follows: Two special hrands of malleable iron, 7⅛ blows, two out of four hrands of steel, 3¼ blows. The average number of blows tor the special brands of malleable lron was 7⅛ blows, or 2⅛ more blows than the proposed test, hence the average special brands of malleable lron met the test while the two ordinary brands of steel did not meet the test. * * * * *

One advantage of malleable iron for car couplers is that it can be cast perfectly solid and free from blow-holes, and malleable-iron castings as a rule are more uniform with less attention in manufacture than steel castings. One of the toughest brands of cast steel that has been used for couplers is pretty well honeycombed and has a very suspicious appearance, but it is, in fact, a good strong material. The softer the steel, as a rule, the more difficult it is to make solid castings. So far only one steel company has succeeded in turning out any considerahle number of cast steel couplers, with few blowholes, that will stand the test. It is a simple matter to cast steel solid if softness and toughness are not demanded. A coupler is difficult to cast in steel, and a steel that will he solld when cast in other shapes and be soft and tough at the same time, often fails to be solid when cast in couplers.—Railroad Gazette.

The Quick-Heating Method of Hardening Steel.

That steel can be heated for safe hardenlng hy more than one method admits of no question. The advocates of the quick-heating system at one time claimed much for this mode, and there are still some old-time smiths who will not heat to harden in any other way.

A veteran in steel practice reminds us, however, that the quick-heating plan was in vogue at a time when everything was faced with steel—that ls, a piece of steel, say three-eighths inch thick or more, was welded or plated on iron and this was heated up quickly for hardening.

The smiths who followed this practice were skilled in the art and could sometimes harden steel of high tempering qualities suitable for purposes such as roll-turning tools and plugs.

The considerahle loss of rolls in hardening, with the best appliances for handling, indicates that where a man can bring these out sound by following the quick-heating method, he had hetter continue in the old way; he would he extremely unwise to change.

The veteran to whom allusion is made has himself hardened ln a single day as many as six large rolls weighing 500 pounds each, or 3000 pounds altogether, and he heated them all thoroughly in a furnace and did not break one. They were mint rolls for "Uncle Sam," and the steel was Crescent special, made with full knowledge of the mode of hardening.

One person may heat a certain shape in an air-tight box with bone and charcoal, while another may prefer the quick-heating method, and both may be alike successful. This is not always the case, but where it is it would be unwise for either to change the mode which has proved itself a success in practice, especially as the steelmaker could be coaxed to try his hand at furnishing steel of tempering qualities to suit either method.—Sparks from the Crescent Anvil.

Preventing Hard Deposits in Steam Boilers.

M. Schmidt, the chief engineer of the Association of Steam Boiler Owners of the Departments of the Somme, Aisne and Oise, reports to his association a very simple method by which a certain boiler user manages to avoid the formation of hard deposits in hls hoilers. It is nothlng more than the following: There are two hoilers in use at one time, and one at rest. The water in use is very bad, being very calcareous and magnesic, with organic matter, chlorides, and a little sulphate of lime. Each hoiler is allowed to go on working for about 500 hours hefore being cleaned. It is then stopped, with the water in it, and allowed to cool down for about a week. The masonry is allowed to become cold; and then the tap is opened, and the safety valve is also opened, so that the water runs naturally out of the boiler. When the boiler is empty it is entered and simply swept. The deposit is in the form of damp mud, easlly swept away, and leaving the hoiler as clean inside as if it were new. This method has been in use for the past five years; and it would appear to lead to the conclusion that the ordinary hardening of the deposits in boilers is due to the absence of water in the hoilers, while the mud and the iron are being heated by the brickwork when the boiler has been emptied by the ordinary method under pressure. It is necessary, however, to be able to do without the particular boiler for eight days.—Gas World, London.

Sulphur in Cast Iron.

In a paper hefore the International Engineering Congress, Mining Engineers' Divlsion, at Chicago, last week, Mr. W. J. Keep of Detroit takes the ground that writers upon the evll effects of sulphur in cast iron have charged to this element more than properly belongs to it. It is a matter of common belief among founders that a small amount of sulphur in the fuel will work great damage, and that a cracked casting or anything out of the ordinary way ls to be laid to sulphurous fuel. In following up his inquiry into the subject, Mr. Keep corresponded with users of sulphurous iron ores and they answered, without exception, that but a small percentage of sulphur could be made to remaln in carbonized iron; that it was difficult, if not impossible, to introduce sulphur into gray cast iron, or intn any carbonized iron.

Mr. Keep made a number of tests, details of which are given in his paper, showing that whether the results which have always been ascribed tn sulphur are produced by some other cause, or directly by the sulphur in the fuel, they are not more to be feared than many accidents of foundry running. "They do not indicate that the iron has taken up sulphur to a damaging extent, and the evil can be prevented, or can be overcome next day by adding enough silicon iron to replace the silicon that has heen driven out."

One of the tests consisted in melting 25 pounds of Swedish gray charcoal pig iron containing 1.249 silicon and 0.187 manganese, and feeding slowly eight pounds of hrimstone, keeping it as closely covered as possihle. When the operation was completed, there was at the hottom about five pounds of silver-white iron covered with a very rich sulphide of iron. The white iron showed 0.58 sulphur—conclusive proof that a carhonized iron could not artificlally be made rich alone in snlphur. Messrs. Weston & Smith, Mr. Keep adds, found it was difficult to cause cast iron to take up sulphur. The conclusion derived from all the tests was that sulphur, if present to any extent in cast iron, "tends to increase shrinkage and to turn the iron white;" but to prove this tendency, it was necessary to add percentages of sulphur never found in commercial pig iron. In white iron, it is agreed, not more than 0.75 per cent of sulphur, in mottled iron not more than 0.25 per cent, and in gray foundry iron not more than a few hundredths of one per cent can he found.

A Screw Steamer in Shallow Water.

Something of a novelty in shiphuilding is reported from England. Messrs. Yarrow & Co. have built, for service in the Zamhesi river, in East Africa, a boat 45 feet long, having 7 feet beam and drawing only 12 inches of water. The bottom is perfectly flat, and the bow is spoon-shaped. The chief novelty in her construction is the provislon for keeping the screw, which has a diameter of two feet, submerged. This difficulty is met by having the shaft on a level with the vessel's bottom, and building a sort of horizontal tunnel over the propeller. In some earlier inventions of this kind it was considered necessary to pump water up lnto this tunnel in order to keep the screw entirely immersed. But experience has shown that the action of the propeller itself is quite sufficient to draw up the water and drive the air out at the after end of the tunnel. The *Engineer*, a London publication, says:

"On trial in the Thames a speed of seven to eight miles an hour was easlly maintalned, and the towing power of the boat was excellent. This little vessel is capable of seating comfortably about 35 passengers, but it is mainly iotended for towing small native barges. There is a wooden awning extending the whole length, to serve as a protectlon against sun and rain. Steam is generated hy a horizontal boiler. The steering wheel is forward as usual in vessels for tortuous rivers, where a good lookout for snags, etc., is of the utmost lmportance. The hull is constructed of galvanized steel, which is the most durable material for African river steamers."

FENDERS ON STREET CARS.—Cahle and electric cars in some cities are provided with fenders, which come down within a few inches of the track, and which are almost as efficacious as a locomotive's "cow-catcher" in saving the lives of people or animals which may be ahead of these vehlcles. These, however, are fixed, and are not always low enough. An improved safeguard of this class has recently heen tried in Boston. An apron, made of parallel steel wires, slightly curved, projects from the lower edge of the front dashboard, forward and downward, on a slant. It is square across the front, where the wires are attached to a horizontal rod. By means of a lever, the motorman or gripman can lower thls apron so as to touch the rails (where it rests on small rollers), and thus slide under any obstacle, shovel-fashion. Usually, however, the forward edge is carried at a greater height.

Scientific Progress.

A Toad Buried for Centuries.

A dispatch from Tacoma, Wash., Aug. 18th, has the following:

The ancient toad, with curious cat-like claws, that was found embedded under 17 feet of hardpan in this city two weeks ago, has gone into a trance again and convinced everybody that it can suspend animation indefinitely at will or hy accident.

This toad is about the size of an egg. Its color is of the same grayish shade as the hardpan, and resembles a tree toad more than any other of its hrothers or sisters. Some men were digging a cistern when one of them drove his pick into the hard earth, and at the end of the pick he found a smooth hole, in which was the toad, apparently dead.

Ten minutes in the open air hrought the toad to life. He ate several flies that were captured for hlm, and until yesterday afternoon had lived two weeks in a bottle, the hottom of which was covered with water and pulverized earth. Hundreds have inspected him, and there have heen many conjectures as to how many thousand years he had been in the earth. That he did not die after heing in the open air a few hours surprised all the members of the Tacoma Academy of Sciences. Yesterday he crawled out of his bottle and fled. This morning he was found pulseless, rigid and cold, wedged between a stick and a kitchen sink at the home of Henry Henderson, on whose premises he was found. He was pronounced dead, placed in some water, and was about to be buried when he regained animation. This resurrection, the Hendersons and hundreds of others say, is conclusive evidence of the fact that this toad has been buried for centuries, and the little hopper is now a greater curiosity than ever.

HARDSHIPS OF LIFE IN THE POLAR REGION.—The whole region is one of severe cold, and the sea is frozen for the greater part of the year, land and water becoming almost indistinguishable, but for the incessant movement and drift of the sea-lce. In summer the sea-ice breaks up into floes, which may drift away southward and melt, or be driven hy the wind against the shore of continents or islands, leaving lanes of open water which a shift of wind may change and close in an hour. Icehergs launched from the glaciers of the land also drift with tide, current and wind through the more or less open water. Possibly at some time the pack may open and a clear waterway run through to the pole, and old whalers tell of many a year when they believed that a few days' steaming would carry them to the end of the world, if they could have seized the opportunity. At other times, routes traversed in safety time after time may be effectively closed for years, and all advance barred. Food in the form of seals or walrns in the open water, reindeer, musk-ox, polar bears or birds on the land, may often he procured, but these sources cannot be relied upon. Advance northward may be made by water in a ship, or by dog-sledge, or on foot, over the frozen snow or ice. Each method has grave drawbacks. Advance by sea is stopped when the young ice forms in autumn, and land advance is hampered by the long arctic night which enforces months of inaction, more trying to health and spirits than the severest exeition.—McClure's.

TESTING FOR ARSENIC. — In cases of medical jurisprudence it is, says *Industries and Iron*, unfortunately often necessary to test for arsenic. It was, and we fear still is, usual to use zinc to produce arseniureted hydrogen. There is great difficulty in procuring zinc absolutely pure and free from arsenic, and as the least trace of arsenic in the zinc might result in untrue evidence being given, whlch might cost the life of a human being, it seems strange that such a test should ever he used now. It ls obvious that zinc should not be employed. A small battery with platinum electrodes will produce the arseniureted hydrogen, if there is any arsenic present, without risk of any misleading results due to impurities. This method was proposed some time ago, but we believe the dangerous method with zinc is not yet superseded, owing to the conservative dread of anything new—especially anything electrical.

LARGE areas of glass at a great height above the ground, as in the roofs of large buildings, are a constant source of expense for maintenance, and a source of danger to people beneath. The *Railway Master Mechanic* suggests that the expense and dangers can be practically ohviated hy the use

of glass molded upon round steel-wire netting. The process of manufacture is such that the oettlog is imbedded in the glass, and fractnre becomes practically impossible; in any case it mnst be limited to small areas, and no broken glass can fall to the ground. This new glazing material can be bent without much difficulty, and lo this way curved skylights can readily be made. The Pennsylvania railroad will use this material in the skylight of its new passenger station at Broad street, Philadelphia.

UNDERGROUND COAL PILLARS.—The Philadelphia *Record* contains the following: An innovation which means the reclaiming of millions of tons of coal has been introduced by the Lehigh and Wilkesbarre Coal Company. The plan io brief ls to carry the culm back into the mines by means of water. This culm solidifies and holds up the surface so that the pillars of coal can be removed. These are worth many millions of dollars. The company has just contracted for an elght-inch borehole sunk over the abandoned workings of their great colllery, the Nottingham, at Plymouth. It will peoetrate to a depth of nearly 700 feet, and will then be used to flush the worked out portions of the mine with culm. It has been found that the culm thus finshed ioto the mines solidifies firmly and furnishes an adequate snpport for the strata from nndar which the coal has been removed. Under the present system only 40 to 50 per cent of coal can be taken out, the remainder being left as supports and pillars. Uoder the flushing process a new support is furnished, and new chambers and breasts can be driven around the solldlfied culm, thus making it possible to take out all bot five per cent of the entire deposit of coal as it orlglnally existed.

COAL DUST EXPLOSIONS.—Accounts come from Germany that Herr Krupp is now constrncting a number of experimental engines to test a novel idea. A German inventor has taken out letters patent coverlog the ntilization of the general principle that fioely divided carbonaceous matter floatiog in the air readily explodes. He proposes to grind coal to an impalpable powder, and, after introducing the dnst floating in the air lnto the cylinder of an engine, explode it, the idea being to follow very much the same lines which are being so thoroughly developed in the use of gas in engine practice. Natnrally, the first question which has arisen has been how to get rid of the ash. Herr Krnpp is reported to have stated that his experience in gun manufacture convinces him that this is not a serlous obstacle. The advantages which would grow out of a direct utilizatlon of mineral fuel as mined are very obvious. While modern practice converts only 10 to 15 per cent of the heat energy stored in coal into power at the crank shaft of a steam engine, it is belleved that no less than 75 to 80 per cent conld be made available by the direct combustloo of the fuel through explosion of coal dust.

SHAPE OF EGGS.—Various attempts have been made to account for the diversity in shape seen in eggs. A recent study convinces Dr. Nicolsky that the dlfferenoes may be all traced to gravity, and he finds his idea confirmed by all the eggs in the zoological collection of the St. Petersburg university. He supposes that pressure by the sides of the ovary tends to elongate the egg before the shell has hardened. In blrds which keep a vertlcal position while at rest, as do the falcoo and the owl, the soft egg is made short by the action of the weight of the body against the ovarian pressure; while in birds that, like the grebe, are nearly always swimming, the egg ls lengthened, because the bird's weight acts with the compression by the ovary. The egg is made more pointed at one end than at the other in birds that, like the guillemot, are frequently changing their position, sometimes swimmlng and diving, sometimes perching on the rocks, etc.

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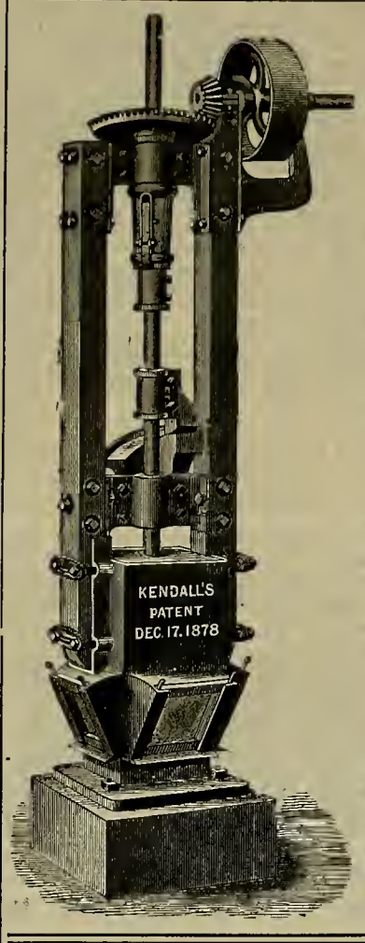

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Electricity.

Do Lightning Rods Protect.

The occasional destruction of buildings on which lightning rods are erected have more than once excited doubts as to the value of the latter as projectors from Jove's thunderbolts. In some cases it has been possible to trace any observed inefficiency to improper construction, to bad ground connection, or to damage done (as by acid fumes from neighboring factory chimneys) to rods which were once reasonably trustworthy. But in other instances the utter annihilation of a house, factory or church by fire as a result of a stroke of lightning has made it impossible to investigate the condition of the apparatus; and hence the questions excited in people's minds by the apparent failure of the rod to perform its function remain unanswered; nor has it tended to restore public confidence to notice what wide differences of opinion exist among experts as to the theory on which these devices operate, if they protect at all, and as to the proper form to give them if they are to do good instead of positive harm.

Scarcely had the Lightning-Rod Conference of Great Britain, after elaborate research, decided (in 1888) that the rods were really desirable contrivances, that a solid rod was better than a metallic tape, and that any flash, no matter how intense, might be safely conveyed to the ground, before another eminent Englishman, Dr. Oliver J. Lodge, presented some considerations which took his fellow-scientists rather aback. He insisted that lightning is sometimes, if not often, an oscillatory performance, the electric current surging to and fro between the sky and the earth like a pendulum instead of pouring all one way as do the contents of a sewer-pipe. This fact (if it be one) and the excitement of a separate set of electric oscillations by mere induction led him to protest against trying to coax the lightning and conveying downward all the atmospheric electricity which any overhanging clouds may manufacture. The policy he advised was to carry off as little as possible, not as much, and not to connect the rod with the gas and water-pipe systems of a house or the town, but to give it an independent "ground" or connection with the layer of perpetual dampness in the earth. The old theory of drawing from a cloud gradually was all right, he said, if the supply would always come gradually; but no sewer could accommodate a bursted mill dam, and he insisted that wholesale and instantaneous discharges of electricity, which he called "impulsive rushes," would occasionally occur, to which no lightning rod would be at all adequate. It would simply invite disaster. The rod, then, should be so small, according to his ideas, as to discourage the fluid from attempting to flow—a mere wire, in fact. To this form, however, he rather preferred a tape, as the latter gave more conducting surface for the same amount of metal.

Alexander McAdie, now connected with the United States Weather Bureau, and an original investigator of these matters for years, has an article on them in the *Popular Science Monthly* for August. He favors the use of rods, prefers copper to iron; would have them weigh six ounces to the foot if of the former metal, and two pounds if of the latter; accepts Lodge's idea about flat conductors; says that chain or link conductors are of little value; advises putting clusters of points here and there along the ridge-rod, and regards an independent "ground" better than connections with gas and water mains. "The top of the rod," he adds, "should be plated, or in some way should be protected from corrosion and rust." It would be hard to find a more trustworthy authority on the subject than Mr. McAdie.—New York Tribune.

Gas versus Electricity in Paris.

Apropos of the struggle between gas and electricity in Paris, it may be of interest to mention that from the report of the Paris Gas Company it appears that the consumption of 1892 was 3,500,000 cubic metres less than in 1891. The decrease falls wholly on the night service, there being an increase in the day consumption for cooking, gas motors, etc., or 27 per cent of the total consumption. The total earnings for the year amounted to 104,800,000 francs, comprising for gas 79,500,000 francs and for coke 17,250,000 francs. The expenditure amounted to 70,170,000 francs, of which 27,245,000 francs were for coals and other fuel. The share of profits of the City of Paris for the year amounts to 17,000,000 francs. The gas company charge 30 centimes per cubic metre to ordinary customers and 20 centime to city works, theaters, etc. The rates are considered by the public too high, but the company rejoins that it is excessively taxed, having, for instance, to pay an octroi duty of 9½ francs per ton of coal.

Electricity Made Perfectly Plain.

An old man from somewhere among the suburbs stood on a Forty-seventh street corner watching a trolley car moving swiftly eastward with a heavy load of passengers.

"That's some of these 'lectric cars, ain't it?" he said, turning to a bored-looking man who was leaning against a telegraph pole.

"Yes."

"I don't see how 'lectricity can make a car full o' people flip along over the ground like that."

"You don't?" exclaimed the other, becoming interested. "Why, it's easy enough to see through when you once understand it."

"I 'xpect so; but I've never heard enough about it to understand it."

"It is all a matter of watts. A watt, don't you see, is a fraction of a horse power expressed in the technical language of electrical engineering. You know what an ampere is, don't you?"

"A what?"

"An ampere. It is a quantity of electricity that goes through the wire and develops the watt. The electricity comes from the central dynamo through that wire you see running along overhead, runs down through that iron pole and goes to the motor, which is an ingenious but perfectly simple arrangement of wire coils with a revolving frame, acted upon by the current, which sets it to spinning and thus puts in motion a small cog-wheel that engages another cog-wheel that communicates the rotary movement to a third cog-wheel fastened to the axle of the car. It is as plain as day when you get the idea."

"Yes, but how—"

"Don't you understand it yet? There's a sort of wire brush that presses against a copper plate connected with the motor, and the wire is wound on the frame I was telling you about, so that when the current enters the motor it can go either way, and part of it goes one way and part the other, so that the pressure is applied in opposite directions, and that's what makes the jigger revolve and sets the wheels in motion. The current goes back through an underground wire. See through it now?"

"Y-yes. I think I kind o' get the idee."

The affable stranger strolled down the street and the old man took another look at the overhead wire, gazed earnestly in the direction in which the car had gone, took off his hat and wiped his forehead.

"What I'd like to know," he muttered, "is how in thunder the electricity makes the car go."—Philadelphia Inquirer.

An Electric Jute Mill.

The *Mexican Trader* states that Mr. Thomas F. Kinneil, the holder of a concession for the establishment of jute factories at Orizaba and elsewhere, has already secured the capital necessary for the erection of the first factory, which will be situated at Barrio Nuevo, Orizaba. The shares, amounting in the aggregate to £100,000, have been placed in London. The foundations of the factory have been dug out, and those for the house are being prepared. Work on the canal and tunnel is progressing, and both will shortly be finished. The waterfall at Barrio Nuevo is a very fine one, its force equalling an 11,000-horse power. The factory will be situated 1¼ miles away from, and some 600 feet above the level of, the wheel-house. Pelton wheels will be exclusively used, and enough of the electric power generated to drive the machinery. The head-race will be 321 feet in length, and from the head-race the water will be conveyed in pipes to the wheel house. The fall will be 115 feet. Four dynamos will be used, and every machine in the factory will have a motor of its own, varying from 1 to 20-horse power. This will be the first jute factory in the world driven by electricity. The whole of the electric plant has been ordered in England, and will be the largest of its kind—*i. e.*, used for driving a single factory—in the world. The plant has been made specially for the factory. The factory will be built of iron and corrugated iron. The fact that no belting or shafting will be used enables the company to dispense with solid masonry, etc., which would otherwise be necessary, and thus a great saving will be effected. The Santa Gertrudis Jute Mill Company, Limited, by whom the venture is being made, intends manufacturing all articles which can be made of jute, and hopes soon to have its machinery, etc., all erected, so that operations may be commenced with the least possible delay.

REMARKABLE ELECTRIC RAILWAY.—Should the plans prepared by an Italian electrical engineer, Signor Avena, be realized in Naples, Italy will boast one of the most remarkable electric railways in the world. The length of the line is not great, but the idea is bold and original. The railway is intended to establish connection between the districts around Via Roma and the Corso Vittorio Emmanuele, and the line is to be carried across two viaducts built of iron. A stone tower is to be built at the Via Roma, whence the first viaduct, 360 meters long, is to lead to the Corso Vittorio Emmanuele, where it finishes in a tower 150 meters in height. The second viaduct, 290 meters, is to run from this tower to the Via Rione de Vernero.

A NOVEL ORGAN.—It was recently reported that St. Thomas' Church, Taunton, Mass., had imported an organ from Europe, which was something remarkable as a novelty, by reason of its mechanism being controlled by electricity. An experienced organist in Brooklyn, having examined the descriptions, says that, with the exception of some details, the invention is far from new. Organs have been worked by electricity in this country for years. The movable keyboard, or "console" is original, however, and possibly some of the mechanism for mixtures and transposing music from one key to another.

Useful Information.

The Iron Industry.

The official statement of the Iron and Steel Association shows that, in spite of all discouragements and obstacles, the great industry produced and consumed an enormous quantity of iron in the first half of 1893, though a little less than in either half of 1892. The production was 4,562,918 gross tons, but the stocks unsold increased from 535,616 tons January 1 to 578,831 June 30, so that the quantity approximately representing consumption in the manufacture is 4,519,703 gross tons. This is about 100,000 tons less than was consumed in either the first or second half of 1892, but the difference is little more than 2 per cent.

It is true that over 200,000 tons more iron was produced during the first half of 1892, but unsold stocks increased 148,000 tons, so that the approximate consumption was 4,621,062 tons. In the second half of last year production was less, only 4,387,317 tons, but unsold stocks were reduced 240,000 tons, so that the approximate consumption was 4,627,555 tons. In the first half of 1891 production was greatly interrupted, amounting to only 3,368,107 gross tons, but unsold stocks were considerably reduced, and the approximate consumption was only 3,544,462 tons. But much of the work waiting to be done was only carried over into the second half of the year, when both production and consumption rose to the highest point yet attained, the production to 4,911,763, and deducting increase in stocks the consumption was 4,776,385 tons, a part of which was by way of compensation for the interruption during the first half of the year. These estimates do not take into account the small supply going into consumption from foreign imports, which is not definitely ascertained by half years. Reckoning thus roughly, from production and reported domestic stock only, the approximate consumption by half years has been:

	First half, tons.	Second half, tons.	Total, including imports.
1890	4,496,854	4,321,519	8,959,679
1891	3,544,462	4,776,385	8,381,674
1892	4,621,062	4,627,555	9,318,748
1893	4,519,703	.....	.....

It will be seen that, with many furnaces and works now idle, there is little chance that the production or consumption of 1893 will reach the record of former years, remarks the New York *Tribune*, commenting on the figures. But it is a fact of interest that the orders obtained and the contracts made months ago, before the people had voted for a change, were large enough to sustain the manufacture during nearly the whole of the first half of 1893 at about its maximum activity. For three years and a half, excepting only the interrupted half of 1891, this industry has gone on at a rate far surpassing the utmost that ever has been accomplished in Great Britain, either as to quantity of iron produced or as to quantity consumed in the market.

British production last year, according to the British Iron Association, was only 6,616,890 tons—the smallest since 1879. Although stocks were reduced about 540,000 tons, the quantity exported without manufacture was 767,000 tons, so that the consumption in the manufacture in Great Britain was 6,391,650 tons, which is less than the consumption in this country in either of the last six years. But if the advocates of a change have their way, our country may fall back to a second place again.

Comparative Values of Timber.

In a lecture on timbers used for railway purposes, delivered hy Mr. Goff, at the Railway Institute, Sydoey, New South Wales, it was stated that timher when perfectly dry lost about one-third of its weight, and the following timbers shrink in breadth in drying as follows: English oak, 1·12; Riga fir, 1·32; Dantzic, 1·38; elm, 1·24; yellow pine, 1·38; pitch pine, 1·40; and kauri, 1·64. In his comparison Mr. Goff took English oak as a standard of measure of the qualities of strength, stiffoess and toughness, and explained that by strength he meant the property whicb resists fracture or breakage whether as a beam or post; stiffoess, the quality of resistance to flexure or beoding; and toughness, the power to bend the most before fracture. The following table of comparative qualities of various woods was presented:

Variety.	Weight per cubic ft.	Strength.	Stiffness.	Toughness.
British oak	45 to 58 lbs.	100	100	100
Baltic Riga oak	43 to 54 lbs.	108	93	125
American oak	37 to 47 lbs.	86	114	117
Danizic oak	42 to 53 lbs.	107	117	99
Elm	35 to 46 lbs.	82	78	86
Pine or fir	29 to 42 lbs.	80	114	58
Poplar	33 lbs.	86	66	112
Mahogany	35 to 53 lbs.	96	93	93
Tamarack	32 to 40 lbs.	102	88	130
Walnut	50 lbs.	90	70	110

Try, Try Again.

Darning thin places in blaokets as you would stockings.

Rubbing out grease on a carpet with cornmeal.

Whiting and benzine mixed together to clean marble.

Wiplog colored matting with salt water.

Chlorinated soda for ink stains.

Cleaning brass with hot water, rubbing, then, with a soft cloth and lemon juice, rinsing in hot water and polishing with a chamois.

Cleaning willow with salt water.

Shuttlog a boiler of boiling water in a room from which the paper is to be removed.

Weak lye, or saleratus water, for cleaning paint.

This grease eradicator: Two ounces of ammonia, one ounce of soap-shavings, one quart of soft water and one teaspoonful of saltpetre.

Having all flannel or broadcloth goods sponged before making up, to prevent spotting.—Good Housekeeping.

PINE NEEDLES VS. MOTHS.—I have just been circumventing the wily moth, and as I dislike the odor of camphor and tar as much as ever they do, I seldom use either. I once packed a balsam fir pillow away among my woolens, and neglected to take any precautions against moths in that trunk. I was almost afraid to open it the next fall, expecting to find things in it rnined, but a fragrant odor of pines greeted my nostrils and not a sign of moth. I took the hint, and ever since have used pine needles in place of the odious carbolated preventives. Every one knows they won't go near cedar. I wish my lady readers would try my plan and make bags of pine needles to put among their packed-away woolens. Another delightful preventive is to make sacbet bags of ground spices, cloves, cinnamon, allspice and orris root. This, of course, is quite expensive and is used only for my especially nice things.—Indiana Farmer.

EFFECT OF TOBACCO ON BOYS.—The boy who smokes saps his physical strength. In boat races and games of baseball, cricket, bicycling and other athletics the habitual smoker stands no chance against the young man of pure, cleanly and temperate habits. Some investigations have recently been made which convey a startling warning to smoking boys. From measurements of 187

students in Yale college it was found that those who let tobacco alone gained over those who used it during the college year 1892, 22 per cent in weight, 29½ per cent in height, 19 per cent in girth of chest, and 66 per cent in lung capacity. Measurements at Amherst college showed even greater difference in favor of those who did not use tobacco. With such evidence as this before him, no sensible boy is likely to try to cultivate the tobacco habit, or to cling to it if he has already acquired it. Give the boys more opportunities for atheletics and they will require less tobacco.—Troy Times.

THE PIANO AND TEMPERATURE.—This is the gist of what an expert has to say regarding care of pianos, in the *Recorder:* "The most serious injuries that befall pianos are usually the results of temperature; either it is too dry or too damp. The incompetent tuner does great harm, but the extremes of hot air and moisture do more harm than all the tuners alive. If your house is heated by a stove, put your instrument in a room without a stove—in one that is heated from an adjoining room. If you have steam or furnace heat, your piano will do better if kept in a room that is not quite warm enough for comfort. You know the sounding-board—the life of a piano—is forced into the case when it is pressed so tightly that it bulges up in the center. The wood is supposed to be as dry as possible, but of course it contains some moisture, and gathers a lot more on damp days and in handling. Now, when you put a piano in an overheated dry room, all this moisture is dried out and the board lose its 'belly' and gets flabby and finally cracks. Even if it does not crack, the tone loses its resonance and grows thin and tinny, and the felt cloth and leather used in the action dry up, the whole mechanism rattles, and the piano is blamed."

TO PROTECT PILES. — Dr. Willis E. Everette of Tacoma, Wash., appeared before the local Harbor Commissioners last week and told of a chemical preparation he has compounded. It preserves piles from teredo, and lumber from the ravages of all sorts of insects. It renders the wood non-inflammable. If Dr. Everette's discovery is what is claimed, it is indeed very valuable. Its usefulness will be appreciated not only in San Francisco, but on Puget Sound, where the average life of the unprotected pile is two years.

THE cough or puff of a railway engine is due to the abrupt emission of waste steam up the chimney. When moving slowly the coughs can, of course be heard following each other quite distinctly, but when speed is put on the puffs come out one after the other much more rapidly, and when 18 coughs a second are produced they cannot be separately distinguished by the ear. A locomotive running at the rate of nearly 70 miles an hour gives out 20 puffs of steam every second, that is, 10 for each of its two cylinders.

STEEL FOR STAMPING DIES.—Steel for stamping dies should be softer than steel for cutting dies. So, also, there should be a difference in cold and hot cutting dies. One who makes die steel a special study soon becomes aware of this difference. The die-worker should use only a slow fire.—Hints on Steel.

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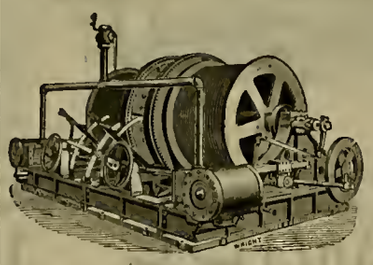

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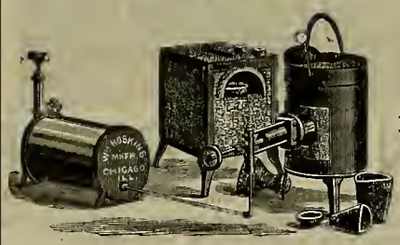

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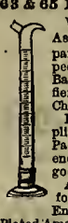

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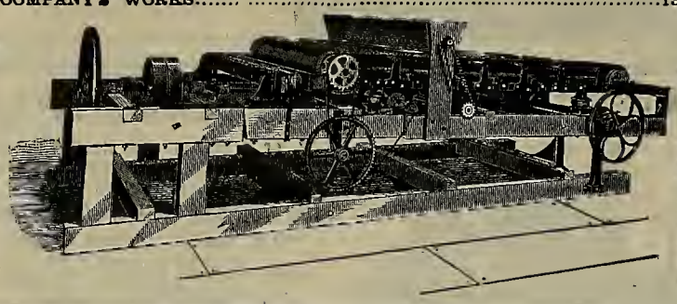

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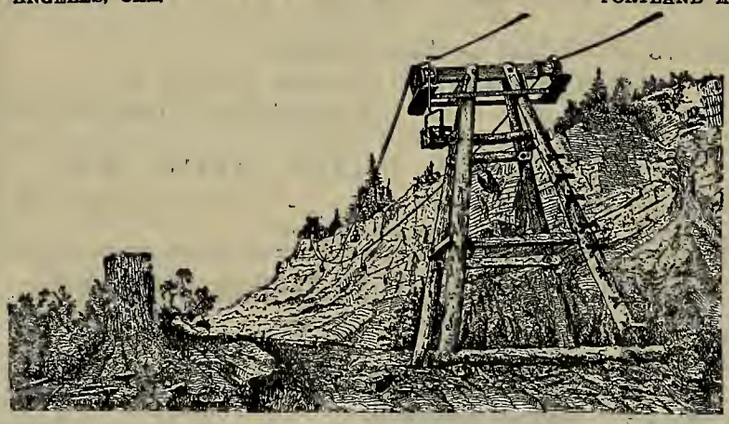

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Coast Industrial Notes.

—Gila canal has been opened in Arizona and water turned in.

—Salted seal skins have advanced from $14 to $18, following the Behring sea decision.

—Considerable building is going on at Susanville, Lassen county, recently devastated by fire.

—A new racetrack near San Mateo is talked of. The total cost will be between $50,000 and $65,000.

—The citizens of Haywards have decided to bond the town for $33,000 for the construction of a system of sewerage.

—Fires in the State of Washington Tuesday destroyed $40,000 of property as follows: Fairfield, $12,000; Winlock, $28,000.

—It is proposed by Australia coal mines to reduce the price per ton from 10 to 9 shillings. The difference in this city will be about 25 cents per ton.

—J. L. Weaton and E. L. Cooksey have purchased the machinery in the old Hartwell sawmill in American Valley, Plumas county, and intend to move it to Indian Valley and erect a mill there.

—Every transcontinental line, including the Canadian Pacific, has agreed to be represented at the meeting to be held at Chicago August 28th to advance the present war basis of freight and passenger rates.

—The icing of the refrigerator cars is quite an industry at Boca, Nevada county, and affords employment for about 70 men. The number of cars iced per day is from 15 to 25, and are iced for carrying fruit.

—At Grass Valley the city trustees have been requested by the Board of Health to devise some means of providing a sewerage system by submitting the proposition to a vote of the people or by some other method.

—The new ice-houses at Prosser Creek, Nevada county, are progressing finely and are nearing completion. About 80 men are employed in the construction of these buildings, which give this vicinity a lively appearance for a short time.

—The commission appointed to select a site for a State normal school in Whatcom county, Washington, has voted to accept ten acres between New Whatcom and Fairhaven, a beautiful locality on the heights overlooking Bellingham bay.

—The sawmill of A. McIntosh & Sons, between La Porte and Strawberry valley, Plumas county, was burned to the ground recently. The mill and all the machinery is a total loss. The fire also consumed a big pile of lumber, shingles, etc. It was the work of an incendiary.

—The Northern Pacific employes, believing they furnish the most of the ready money in circulation in Tacoma, have determined, in view of the reduction in wages, to establish a local supply store, if the local retailers refuse to sell at prices as low as at San Francisco, Chicago and other large cities.

—The first detachment of the Royal Marine Artillery to replace C Battery, R. C. A., consisting of three non-commissioned officers and fourteen gunners, has arrived at Victoria, B. C. All are trained for submarine work. It is presumed they will construct the submarine portion of the Esquimalt fortifications.

—At a meeting of the stockholders of the Mokelumne Water Company held at Lodi recently, the Board of Directors was empowered to issue bonds in the sum of $500,000 for the construction of the irrigation ditch. The lateral surveys have already been made, and work will commence on the ditch at once.

—The Board of Supervisors of Stanislaus county has granted a franchise and right of way to Messrs. Dunlap and Woodside for a proposed electric road over and along the county-road, from the town of Oakdale to the county line of Tuolumne. The latter is expected to grant a franchise from the county line to the town of Sonora.

—Track-laying on the Baden extension of the San Francisco and San Mateo electric railway is nearly completed, the road-builders having reached Baden last week. In less than a month the road will be in operation direct from the ferries to the Baden packing-houses, and the residents of that town will enjoy a ten-cent fare from their city to San Francisco.

—The steamer Mascotte, built and equipped in Victoria especially for wrecking, and owned by J. C. Prevost, Registrar of the Supreme Court, was totally destroyed by fire last week while lying at anchor in Pachena bay, a point on the coast between Cape Carmanah and San Juan. Mr. Prevost is advertising for bids to construct a new vessel, on the same plan but much larger.

—It has been decided to go ahead with work on the dome for the rotunde of the San Francisco city hall, the design best known as "Mayor Ellert's plan" having been accepted and the octagonal shaft formerly proposed, discarded. The height will be 250 feet from the ground. Architect Shea has been directed to draw plans and specifications for letting the necessary contracts.

—A free restaurant for the unemployed has been established on the new postoffice site in this city. The lumber has been donated, the use of the ground has been obtained by arrangement with the Federal authorities, the work was performed by the men themselves, and the public will be looked to for the materials wherewith the needy may be supplied with simple food in the landlot kitchen.

—Standard barrels of cement are selling in San Francisco at from $2.25 to $2.30 a barrel. One of the leading contractors purchased 1000 barrels from Balfour, Guthrie & Co. some time ago at $2.20 a barrel and 1000 barrels of Balfour, Guthrie & Co. at $2.30 a barrel. These prices are for cement at the warehouses. Of late dealers say there has been a stiffening in the market and that prices will rule a trifle higher.

—The water in the Tuolumne river has receded very rapidly recently, save the Modesto *Herald*, and all of the water is now running through the waterways of the joint dam which will allow the work to proceed for the balance of the dry season without interruption. The force of laborers will be increased fully 200, and the work pushed to completion. There is but little, if any, doubt that the dam will be completed by January 1st next.

—It has incorrectly been stated that 1000 men have been discharged from the Southern Pacific railroad tunnels at Santa Margarita. Altogether there is a force of 1200 men at work on the tunnels and grade. Four hundred men are all that have been discharged, the contractors being so nearly through grading that it was found necessary to discharge part of the working force in order that the tunnel may be finished at the same time as the grading.

—The cannery men of the Columbia river made another attempt Tuesday to get together and form a combination for mutual protection. There was a large attendance, nearly every cannery on the river being represented. Matters were finally left in the hands of a committee, which was empowered to map out a scheme for handling all the canneries under one head and to draft articles of incorporation. It is doubtful whether the new idea will be carried out.

—Local arrangements are said to be practically concluded whereby brick will go up $2 a thousand and there is a prospective rise in lumber and a slight advance in cement. Eight days ago hard brick was selling for $7 a thousand. The price will now be quoted at $9. The principal brickyards from which this city obtains it supply are situated in Alameda, Santa Clara, Marin, Contra Costa and Sacramento counties. The trust consists of an understanding among a large number of brickmakers not to sell below $9 a thousand.

—During the year ending June 30, 1883, the gross receipts of the S. F. Postoffice amounted to $558,954.18. In the year ending June 30, 1893, this had been raised to $820,505.92, a gain of $261,551.74. This makes a gain in the gross receipts of 1893 over those of 1883 of over 45 per cent, although letter postage had in the meantime been lowered 33⅓ per cent and the rate on second-class matter 50 per cent. Without doubt the receipts for 1903 will be at least 60 per cent greater than those of to-day. This will bring them up to about $1,250,000.

—During the time from May 30th to June 15th of this year, six shipments of trout eggs, aggregating 736,000, were sent from Shovel Creek Fishery at Klamath Springs to the Sisson hatchery. Of these, Mr. Richardson has succeeded in hatching out 99 per cent. During the month of July, shipments of young trout were made as follows: Coffee creek, the headwaters of Trinity river; Castle lake, Bogus creek, Angel creek, Shovel creek, Butte creek, Antelope creek from 3000 to 5000, and each of *Salmo fontalis*. Ten thousand young rainbow trout were placed in the headwaters of the Yuba river and a like number in the headwaters of the American river. On August 2d 20,000 rainbow trout were shipped to Carmel reservoir at Pacific Grove. On August 4th the following shipment of rainbow trout was received at Truckee and distributed as follows: Prosser creek, 25,000; Deer Park creek, 1500; Squaw creek, 5000; Railroad creek, 5000; Deer creek, 5000; Donner creek, 500; California, stream, 500. Total, 42,500. All these streams are tributaries to the Truckee river.

—Experimental cheap rates were introduced by the Sunset Telephone and Telegraph Company Monday between the exchanges of San Francisco, Oakland, Alameda and Berkeley. Between subscribers in San Francisco and in any of the other places mentioned the tariff for messages is 15 cents for the first minute and five cents for each additional minute. The time is calculated from the commencement of the conversation and recorded by a time-clock stamp. Non-subscribers will be charged 25 cents for the first minute and five cents for each additional minute. These rates will be maintained for 60 days.

—San Jose is talking of having steel and iron works, erected by H. A. Jones of the Donohoe Steel & Smelting Company, San Francisco. Mr. Jones claims that by his process and methods a steel superior to Bessemer can be produced $5 a ton cheaper than the Bessemer made in Chicago, and by a plant five-sixths cheaper than required for the Bessemer. In his process he requires a superior quality of gas, and this also with power for generating electricity could be furnished very cheaply from such works as he proposes. A plant with a capacity of 100,000 tons of steel a day could be erected for $100,000.

—The earnings of the Southern Pacific railroad for the first six months of 1893 are said to show a material increase over the same period for 1892. The gross earnings for the first half of the year were $23,160,620, the lines west of El Paso being credited with $16,725,698, and those east of El Paso with 6,434,922. The increase on the lines east of El Paso over the same period of last year has been about 10 per cent and about 5 per cent on the lines west of El Paso. In other words, the lines east of El Paso earned gross the first half of this year $589,022 more than was the case for the first six months of last year. The lines west of El Paso show a gross increase of $459 964. The increase in net earnings is about $400,000.

—Contractor Bull is making rapid progress with the work of building the retaining wall on the east side of Humboldt harbor. There are 27 feet of water there now at half-tide, but owing to a mud bank the water shallows down to 15 feet. The retaining wall is run out about a half-mile, and from 500 to 800 tons of rock are being dumped there daily. No small rock can be used on the breakwater, so great care is exercised to have only rock of good size. As the current runs very close to the south wall, and threatens to wear it away somewhat, an effort is being made to turn the channel, and the jetties have done some good. The building of this seawall will cost the Government about $1,500,000.

—The great Sutro swimming baths at the ocean beach near Sutro Heights, in course of construction during the last seven years, will, when completed, take rank among the wonders of the Pacific coast. The tanks are now being roofed over. They are six in number, the largest being 285 feet long and 150 broad. There are to be 500 dressing-rooms. Mr. Sutro's provision for electric lighting is on a large scale. The plant will cost not less than $30,000. It includes 1000 16-candle power incandescent lamps, 20 arc lights of 2000-candle power each, a 20,000-candle power search light and a great reserve storage system. By means of chromatic lenses the search light will make the waves luminous with different colors.

—The Amador Electric Light Company has entered into a contract with the Blue Lakes Water Co. for supplying water for general lighting purposes in Jackson, Amador City and Sutter Creek for a term of 20 years. It is proposed to furnish arc and incandescent lights to Jackson, Amador City and Sutter Creek at a cost to the consumers which will not exceed the expense of burning oil. An electrical engineer will arrive at Sutter Creek in a day or two for the purpose of making surveys, maps, etc., and immediately thereafter the work of putting up the line will begin. Suitable buildings, etc., will be erected in the place of the present structures. The following are officers of the Electric Light Company: Pres., E. C. Voorhies; Vice-Pres., H. H. Towns; Treas., Anglo-California Bank (Limited); Sec'y, C. R. Downs.

Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

BIG YIELD.—Sacramento *News*: The Kennedy mine last year sent over $600,000 to the Mint, and yields regularly every month from $60,000 to $70,000. It is operated with two shafts, one of which has a depth of 1600 feet, the other 1700 feet. J. F. Park, a practical miner, is the superintendent. This mine alone gives employment to 127 men, whose wages are from $2.50 to $3.50 per day, with a pay day once a month. The mill is but one mile from the town of Jackson. A little town has sprung up around the mine, with hotel, stores, etc. The mine, mill, buildings and grounds are lighted with electricity. From present appearance the rich ore in this mine cannot be exhausted for many years.

SHAFT REOPENED.—*Ledger*, Aug. 18: F. Mace and son, P. B. Mace, have reopened the old Modoc shaft, located near Pioneer creek, and are working two shifts of men in its development. The Argonaut Company commenced work upon their property, the Pioneer mine, last week, cleaning out the shaft and getting ready for the extensive development of the property contemplated. At the Hardenburgh the sinking has been completed, the shaft now being 800 feet in depth with a 50-foot enlp. The intention of the owners, Hayward & Lane, is to cut a station at the 800 and drift into the ledge, making a thorough prospect of the property at this level. At the Albany, drifting is now in order. In the Astoria the Littlefield tunnel is still being extended across the country rock with favorable prospects.

CONTRACTS LET.—Amador *Record*, Aug. 17: Two contracts have just been let for the Belmont gold mine at this place—one to drain the Boss shaft down to the 200-foot level and then drive a drift from that point 224 feet; also to extract ore on the south end of the mine and run the company's ten-stamp mill. This work will necessitate a pay-roll of from 12 to 15 miners. The work will be carried on judiciously and systematically under the direction of Supt. Tibbits. The shaft at the South Eureka mine is now down 900 feet. According to the present rate of work, the 1000-level will be reached in another month. The favorable indications encountered on the 500-level make it almost certain that a big mine will be developed when the new level is opened up. Active operations are being inaugurated at the Bunker Hill mine near Amador City. Several men have been put to work and the force will be gradually added to. Supt. Myers is kept busy putting everything in shape, and soon that camp will present the same lively appearance that it did several years ago. The Bunker Hill is a finely located property, and there is not the least doubt that it will develop into a paying one. The mine is well equipped, so that a vast amount of preliminary work and expense is done away with. It is simply a question of going to work at once on the ledge.

Calaveras.

LIVELY AT ANGELS.—Nevada *Transcript*: Mr. N. C. Farnum informs us that everything in the mining line is prosperous in Calaveras county and is looking better now than it has been in years gone by. The Utica mine at Angels Camp, owned by Hobart, Hayward and Lane, is looking exceedingly well, and pays out $100,000 per month in wages. The prospects and mines all around the place give the most flattering prospects, and the owners are all anticipating a larger yield of gold this season than ever before. The company will soon add 100 stamps to the 200 already in operation. The Grover mine, Mr. Farnum informs us, is situated between Drytown and Amador City. The depth of the mine is 1100 feet, and up to within the last 40 days the mine has scarcely paid, it having been close work to meet the expenses. It is different now. Within the last 40 days the miners have cut into quartz that pays $20 per ton and the quartz is plentiful. The mine is being pumped to the depth of 900 feet by electric-power, and now the company will go to work and put in electricity as a motive power for its entire working. Mr. Farnum says that the miners and managers over there have come to the conclusion that the country has only been "skimmed," and that deep mining is the thing that pays.

Lassen.

GOLDEN EAGLE SOLD.—Lassen *Advocate*, Aug. 17: The Golden Eagle mine, one of the oldest and best paying mines at Hayden Hill, and owned by Mr. Hopkins of Susanville, was sold on the 8th inst. to Mr. W. B. Scott of Toledo, O. The price paid was $10,000. The mine is worth every dollar of the price paid. The new proprietor has already put on a good force of men. Hayden Hill undoubtedly has some fine paying mines.

Nevada.

WORK COMMENCED.—*Telegraph*: For the past 22 years the Stockton mine, located about four miles south of Grass Valley, near the ranch of Dawson Handy, has been idle. The ledge was worked about 22 years ago by a company of men from Stockton, and they only sunk the shaft down to about 130 feet. There has been $60,000 in gold taken from the ledge during its activity. A gentleman from Colorado named J. Burrowe has charge of the property and is representing a company of men with ample means, and they intend to thoroughly prospect the ledge. Work of cleaning out and repairing the shaft has been commenced and a whim has been erected. The ledge is quite small as far as the bottom of the shaft, but indications show that it will widen as depth is attained. There is an abundance of water power

at hand and ths shaft will be sunk as rapidly as possible.

Placer.

RIVER MINING.—Placer *Herald*, Aug. 19: F. H. Bell, A. Ambrose and A. F. Bigelow have a forcs of 15 or 20 men at work prospecting and developing a gravel claim on what is known as Brown's Bar on the Middle Fork of the American river a short distancs abovs Mammoth Bar. A good many years ago this Bar yielded with ancient appliances some $90,000 as the resnlt of one summsr's work with a small force of men. Those working it now get a good prospect, and are confident iu tbe belief that, when thoroughly opened, it will yield them a good deal of money.

AT WORK IN EARNEST.—*Herald*, Aug. 22: B. F. Hartlsy and son Frank, H. Qnine and F. L. Evans arrived from the East Thursday. Mr. Hartley has incorporated his mining interests at Ophir, as stated last wesk, into the Colnmbia Gold and Silver Mining Co., of Denver, with a capital stock of $600,000. It looks as thongh the company mean bnsiness, for a largs dynamo and other machinery have arrived, and Mr. Hartley says they will commence work ou an extensive plant immediately. A large boarding-house and the necessary auxiliary buildings will be first erected, and the whole property will bs lighted by electricity, thus facilitating the working of day and night shifts. Mr. Hartley thinks he has a good mine, and says he intends to create aud stimulate a mining industry in the Ophir district hitherto uuknowu siuce the days of '50.

Plumas.

WORKING ON A DITCH.—Plumae *Independent*: The Slate Creek Company has at present 35 or 50 men at work on the ditch and finme. Wm. Metcalf employs eight men ou hie logging contract and eight yoke of cattle in the delivery of logs at the company's mill.

MINING SALE.—*National-Bulletin*: During the past two years ex-Recorder A. W. Cook has been making considerable money at his mine in Mohawk valley. Having made a comfortable sum, a few days ago he sold the property to Messrs. L. M. Christie aud B. A. Turner, who will operate it hereafter.

MINE SOLD.—*National-Rulletin*, Aug. 17: The Centennial mine and mill, in Genesee valley, have been sold to Messrs. Stewart and Dean, of Reno. We understands that the price is $8000, and that the purchasers inteud to put into the mill a full outfit for concentrating purposes. Considerable development work has been done on the property.

FROM JAMISON. — *National-Bulletin*: From Sam W. Cheyney, snperiutendent of the Jamison mine, we learn that 30 men are employed at the Jamison mine, and that work is beiug pushed. They now have a fair prospect in the mine. This mine ie located in a gold country —in close proximity to the famous Plumas-Eureka property which, in past years, has produced millions. Development work in the Jamisou is being prosecuted systematically and economically. Should the company conclude to erect a mill, they will have a most excelleut water power with which to operate it.

Shasta.

HYDRAULIC REVIVAL.—*Courier*: Ontside capital may inangnrate a move that will lead to a revival of hydraulic mining iu western Shasta. There are some good properties in that section which have lain idle for a uumber of years, owing to injnnctious being placed upon them by blackmailing schemers. The Harvey mine at Igo was one of the victims.

LEAGED TO AN OREGON SYNDICATE.—Redding *Free Press*, Aug. 19: During the two weeks' trip of iuspection in northwestern Shasta and northeastern Trinity counties, C. E. Brown, E. M., gleaned the following news: Spring Creek district.—The Minnesota claim is to be leased to au Oregon syndicate. A reduction plant is to be placed in the present mill building, which is already equipped with an excellent water-power. French Gulch district.—Considerable activity in prospecting exists. Messrs. Baker, Osborne, the Webb's, the Lowdou's and many others are in the field. J. W. Conant is placing a steam milling plant ou the American mine, and expects to commence redncing ore from two distinct veius which he expects will yield well. Trinity Center district.—A reliable inquiry for gravel exists. Numbers of men of practical experience in other parts of the State have been inepecting the gravel channel between Minersville and Coffee creek. Carrville district.—Parties spoken of above have been inspecting the Nash, Blythe and Carr gronps of gravel claims and mines, and their reports are very favorable as to yield, extent and facilities. The Oro Grande qnartz mine, owned by J. S. Strode & Bro., continues to improve upou development, and the mill is prodncing amalgam at a rate which is very gratifying to the owners. Miniug engineers and experts pronounce it the coming mine of the district.

Siskiyou.

THE SPENORR.—Ashland (Or.) *Tidings*: J. M. Bacon, of Gold Hill, and a Mr. Oliver, of San Francisco, are inspecting the old Spencer mine on Humbug in Siskiyou county, Cal. The mine has a narrow ledge of rich rock, but has been worked at a disadvantage in the past, and it ie proposed to run a long tunnel to drain the mine and reduce the cost of taking out the ore.

Trinity.

BIG CREW AT WORK.—Cor. *Advocate*: There has beeu a great stir in this and neighboring counties over the projected improvements on the now uoted Ward mine, recently purchased by a syndicate of Freuch and Colorado capitalists. The Coloradans and the French msan business. Three hundred men are busy on the ditch. The contractors are a little hampered by lack of tools, such as plows, scrapers, work animals, etc., but a supply is looked for any day uow. The operators are very much in earnest and the mine is now thoronghly opened. An extra good clean-up is anticipated, and the qnantity of gravel that has already been washed is simply immense.

NEVADA.

Washoe District.

TO MAKE A TEST.—Dispatch from Virginia, Aug. 16: The Crown Poiut mine was shut down to-night pending a test of 400 tons of gold-bearing ore recently extracted from the npper levels. Should the test prove satisfactory, operations will be resnmed. If otherwise, suspension of work in the mine will be permaneut.

CON. CAL. & VA. MINE.—Virginia *Chronicle*, August 19: 1500 level—The upraise started in the main south drift on the sill floor of this level, at a point 256 fest distant from the main shaft has been carried up 31 teet; totsl height 52 feet; continuing iu clay and quartz which shows a low assay value. 1600 level—Ths south drift started at the end of the east crosscut run from ths main south drift at a point where it connects with the upraise carried up to the north drift on the 1500 level has besn extended 15 feet; total lsngth, 104 feet; continuing in porphyry and qnartz of a very low assay valns. 1650 level—Have continued making necessary repairs to the drifts on the sill floor of this level; and from the two sides of the drift run east (at a poiut 20 feet down) from the winze sunk from the crosscut rnn west from the main northwest drift; and from the end of the drift (in working upward) run south from that wing at a point 52 feet down, we have extracted during the week 426 carloads of ore—about 420 tons, chiefly from the latter place. Have shipped to Morgan mill during the week 333 400-2000 tons of ore, the average assay value of which (per car samples) was $41.94 per ton. The average assay value (per battery samples) of all the ore worked at the mill duriug the week (380 tons) was $32.22 per ton.

OPHIR.—1565 level—The east crosscut started from the main drift on the sill floor of thie level, at a point 108 feet south from the winze station, has been advanced 16 feet; total length, 40 feet; in a hard porphyry formation.

MEXICAN.—On the 1565 level—The east crosscut from the north drift from the crosscut run east from the bottom of the winze, sunk from the 1465 level down to this level, near the south boundary line of the mine, has beeu extended 23 feet; total length, 202 feet, iu porphyry, clay and quartz.

SIERRA NEVADA.—The intermediate tunnel on Cedar Hill has heen advauced during the week 16 feet, making the total length 543 feet; the face ie in porphyry. The joint Sierra Nevada and Union north drift from the west drift, 1520 feet west of the joint shaft, 900 level, is out a total distance of 72 feet; face in clay and porphyry.

UNION SHAFT.—The joint Sierra Nevada aud Union north drift from the west drift, 1520 feet west of the shaft, 900 level, ie out a total distance of 72 feet; face is in clay and porphyry.

ANDES.—On 420 level east crosscnt from main north lateral drift was advanced 13 feet; total length, 51 feet; face in qnartz and clay. This crosscut has connected with south drift from east crosscut No. 1 north.

GOULN & CURRY.—200 level—West crosscnt No. 5, started in northwest drift, 432 feet from main west drift, has been extended 15 feet; passing through porphyry and seams of clay; total length, 586 feet. North drift, started from west crosscut No. 5, 60 feet from northwest drift, has been advanced 12 feet and discontinued; total length 20 feet; face in quartz and porphyry.

BEST & BELCHER.—200 level—Started west crosscnt No. 3, in northwest drift, 295 feet from our south boundary, and extended same 16 feet, passing throngh soft porphyry and bnnches of quartz. 900 level—West crosscnt No. 5, started iu southwest drift, 100 feet from west crosscut No. 4, has been advanced 14 feet; total length, 76 feet; face in hard porphyry.

HALE & NORCROSS.—On 900 level the west crossut No. 1 from south drift was advanced 20 feet; total length, 52 feet; face in porphyry. 1100 level—Have advanced No. 1 west crosscut from the sonth drift on this level 20 feet; total length, 58 feet; face iu porphyry. In the early part of this week the night shift was dispensed with, and for the present work in this mine will be confined to the day time only.

CHOLLAE.—Have retimbered 50 feet the main tnnnel on 250 level dnring the past week. Have men on repairs in the main incline below the 930 level. The north drift from the west crosscut, 930 level, is out 43 feet; face is in porphyry.

POTOSI.—The east crosscut from the sonth drift, 220 feet south of the shaft, 850 level, is out 22 feet; face is in hard porphyry. The east drift, 73 feet above the 930 level, to connect with north raise from 930 level, is out 133 feet; face is in soft porphyry and streaks of quartz. Extracted and sent to the mill the past week 355 tons and 500 pounds of ore from the 930, 1000 and 1150 levels. Milled during the week 355 tons. On hand at mill 100 tons and 1750 pounds. Average battery assays, $29.69; average car-sample assays, $33.58. Shipped to the U. S. Mint, Carson, 376 pounds of crude bullion.

OCCIDENTAL.—Are extracting from five to six tons of ore per day from the 350 and 400 levels of the average assay value of $26 per ton, as per car samples.

KENTUCK.—Have extracted from the west ledge on the 1100 level about 20 tons of ore per day of the average value, as per car samples, of $7 per ton iu gold. The south drift from the joint east crosscut is in 33 feet; face in low-grade ore.

WARD SHAFT. — The west drift from the station, 820 level, is out 72 feet from the shaft; face is in porphyry.

BULLION.—The west drift from the station, 820 level, Ward shaft, is out 72 feet from the shaft; face is in porphyry.

EXCHEQUER.—The west drift from the station, 820 level, Ward shaft, is out 72 feet; facs is in porphyry.

ALPHA.—The west drift from the station, 820 level, Ward shaft, is out 72 feet from the shaft; face is in porphyry.

Silver Peak District.

INVESTIOATINO MINES.—Walker Lake *Bulletin*: A party of capitalists and miuing men are now at Silver Peak investigating the mines there with a view of purchasing. They are under the escort of Barney Gamble, and are said to bs amply able to buy and work the mines on a large scale.

Kennedy District.

TO BUILN A MILL.—Battle Mountain *Central Nevadan*: William Jenkins retnrned from Kennedy district last Monday, where he had been selecting a sight to build a mill which he proposes to erect immediately. This is something that Kennedy has long needed and which will prove of great benefit to the minsrs and also to the district.

ARIZONA.

EXPOSED FORTY FEET. — Prescott *Courier*, Aug. 19: Carr & Dempsey, owners of the new strike in Eugene gulch, have a body of ore exposed 40 feet iu width, from which several horn-spoon tests gave a result of $10 per ton in gold. This is not a ledge proper but an immense conglomerate blanket deposit, which gives good horn-spoon tests from any point. The Henrietta Gold Mining Company has about 50 men at work. The hoist is working splendidly, there is an abundance of water in the well, and sinking on the mine is going right along. A few days ago a man named Ed Rogers found a boulder two miles southwest of the Little Jessie mine which was literally filled with gold, the rock being worth not less than $500. It was a good-sized boulder. Mr. Rogers has not yet discovered the ledge from which the bonlder became detached.

A NEW GROUP OF MINES.—Prescott *Courier*: About one year ago J. H. Stevens commenced to prospect for a mine in the vicinity of Prescott, and he is now the owner of three gold claims eight miles from town, which he calls the St. Julian group. He is now working in the bottom of a shaft 12 feet in depth with a 14-inch vein exposed, which widene as depth is reached. The ore is full of gold, much of it coarse and visible to the naked eye, and assays from $40 to $500 per tou. He has valuable property which is said to belong to the same belt, and classed as the well-known Chaparral gulch properties. The miues are splendidly located, with pleuty of wood and water near by.

INQUIRINO FOR MINES.—Phœnix *Herald*: Attention of Colorado mining men is being attracted to the gold-fields of Arizoua. There is already some private inquiry for properties. The Harcnvar people are building a fine camp at Morgan City. They are located in a shallow, narrow basin within a stone-throw of the working of their mines. The principal work being done now is on the new mill, and when that is done there will be some lively work. McGinnis Bros. have some first-class gold locations on the same ledge which is furnishing the output for the Harcnvar mill being built at Morgan City. There conld be a chance to dispose of some of these properties it they were developed.

IDAHO.

WORK RESUMEN.—Salt Lake *Mining Journal*, Aug. 18: Work waeresnmed on the Star mine, at Hailey, Idaho, this morning, part of the force having gone up from this city last week. When work was suspended about six weeks ago the face of the crosscnt then being run wae just coming into veiu matter composed of clay and qnartz. Work at this point will be continned and the company expect to encounter a big ore body there very soon. A force has also been put to work jigging the secoud-class dump, composed of abcut 500 tons, some of which is very good ore. They expect to get 100 tons or more out of it of ore that will run at least 100 ounces per ton.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDINO AUG. 1, 1893.

502,648.—JEWEL GAOE—J. F. Adcox, Lebanon, Or.
502,267.—GRAIN BINDER—J. F. Appleby, Santa Cruz, Cal.
502,651. — FRUIT-CLEANER — J. L. Blockburger, Pasadena, Cal.
502,348.—EXPLODER FOR PROJECTILES—J. Clark, S. F.
502,410.—RATCHET WRENCH—W. H. Diedrick, S. F.
502,559.—PLANT PROTECTOR—B. F. Gilman, S. F.
502,416 — BITUMINOUS ROCK MACHINE — E. Groat, San Luis Obispo, Cal.
502,417.—BITUMINOUS ROCE MACHINE—E. Groat, San Luis Obispo, Cal.
502,624.—WATER-WHEEL REGULATOR—E. R. Holoomb, Portland, Or.
502,493.—BOOKBINDING—D. K. Howe, Portland, Or.
502,564.—TOOL-HOLDER—J. C. Hunter, S. F.
502,625.—STATION INDICATOR—H. G. Krasky, S. F.
502 568 —GANO PLANE—L. Kuctartz, Portland, Or.
502,628.—CHURN—R. A Ludlow, Globe, Cal.
502,570. — MOTION TRANSMITTER — W. H. Masterman, Oakland, Cal.
502,572.—BUSHING AND FAUCET—G. H. Merrick. S. F.
502,641. — LAWN SPRINKLER — Thos. Scheen, Oakland, Cal.
502,474.—CONDUIT—G. Sterling, Yakima, Wash.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special msution:

PLANE.—Louis Hardt, Yuba City, Cal. No. 502,906. Dated Ang. 8, 1893. This plane has for its objects the provision of an adjustable exposure of the bit-iron and a varying capacity of the throat. Thess objects are attained by means of the vertical and longitudinal adjnstments of the portion of the sole of the stock in advance of the maiu body portion and of the bit-iron, whereby the exposure of the cutting edge of the iron is increased or diminished, and simultaneously therewith the capacity of the throat is varied.

COMBINED INCUBATOR ANN BROODER.—James W. Atkinson, San Jose, Cal. No. 502,900. Dated Ang. 8, 1893. In this machine the npper portion of ths frame forms the brooding chamber and derives its necessary warmth from the heater of the incubator. Provision is mads for supplying ths brooding chamber with fresh, pure air, heated by contigoity with the top plate of the underlying heater. The foul air finds ready escape from the broodcer, which is thus perfectly vantilated and a circulation and constant sopply of pnre, fresh-heated air are maintained. The brooder is so located and constrncted as to permit the ready removal of the heater without dismembering the frame.

BICYCLE.—Henry S. Williams, Madera, Cal. No. 503,513 Dated Augnst 15, 1893. This machine is intended to be driven directly by the hands of the rider, whose feet rest on bearings so located that his legs serve as straining levers, whereby he is enabled to use the full power of his arms, back and legs to the best advantage. The frame of the machine is hinged in a vertical line about its middle. The saddle ie back of this line and the hand-gear and foot-rests are forward of it, so that the machine may be easily steered by the movements of both his hands and feet or of either.

SNAP-BUCKLE.—G. F. C. Schroter, Redding, Cal. No. 503,499. Dated Aug. 15, 1893. This device is a combined buckle and snap-hook. It is composed of an open frame or loop having the ends of its sides upwardly corved, with a top cross-bar, under and back of which is a second cross-bar. The opposite end of the frame serves ae a cross-bar and has projecting from it a slotted hooked bar with a spring-actuated tongue forming the snap. Two other cross-bars in different planes are betweeu the other bars, and upon these intervening bars are oppositely-exteuding tongues finding seats upon the bars adjacent to tbeir free ends. This device has few parts aud no projecting points.

Cal. Debris Commission Notices.

NOTICE.—The California Debris Commission, duly appointed under the Act of Congress of March 1, 1893, having received a petition of R. M. Moser and J. O. Boyd for permission to mine by the hydraulic process at the Kelly Hill Gold Gravel Mining property, situated in Butte County, in sections 27 and 28, Township 23, N., Range 3, East, and to deposit tailings in Neshit and Brewer Gulches, which discharge into Big Butte Creek, gives notice to all concerned that a hearing will be held at the office of the Commission, Room 92, Flood Building, San Francisco, on August 29, 1893, at 1:30, P. M. On and before this hour and day all parties interested may file affidavits, plans and maps, in support of their respective claims. By order of the Commission; W. H. Heuer, Major, Corps of Engineers, U. S. A., Secretary.

NOTICE.—The California Debris Commission, duly appointed under the Act of Congress of March 1, 1893, having received a petition from N. O. Tully for permission to mine by the hydraulic process in the Omega Mining District, situated at the village of Omega, Washington Township, Nevada County, California, and to deposit tailings behind a dam in Scotchman's Creek, which discharges into the South Yuba River, and having also received a petition from Robert McMurray, attorney-in-fact for the Eureka Lake and Yuba Canal Company Consolidated, for permission to mine by the hydraulic process the Farrel mine, situated near Columbia Hill, Nevada County, California, and to deposit tailings behind a dam in an old hydraulic pit, gives notice to all concerned that a hearing will be held at the office of the Commission, Room 92, Flood Building, San Francisco, on September 4, 1893, at 1 o'clock P. M. On and before this hour and date, all parties interested may file affidavits, plans and maps in support of their respective claims. By order of the Commission: W. H. Heuer, Major, Corps of Engineers, U. S. A., Secretary.

Mining Property For Sale.

A Drift Gravel Mine of 250 Acres at Forest City, Sierra Co., Cal.

Blacksmith shop and tools, T-rails for 800 feet of tunnel, 500 feet tunnel completed. Mine incorporated. For particulars inquire of the undersigned at Forest City. **B. F. DERICKSON,**

Forest City, July 25, 1893.

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Market Reports.

The Markets.

SAN FRANCISCO, Aug. 24, 1893.

Lead has hung stationary for some time at about $3.30 to $3.40 per 100 pounds. The normal price of the metal, taking a long series of yearly and monthly averages for a guide, is somewhere about $5 per 100 pounds. From 1870 to 1879 the New York quotation was almost constantly above $6, though there were a few exceptional quotations made just under that line. From 1880 to 1884 it ranged between $4 and $5. In 1885 it fell as low as $3.65, but soon recovered. In the last few years the average has held at above $4, the range in 1892 having been $4.30 to $3.80, but with quotations for most of the year over $4. The strikes in the Cœur d'Alene silver-lead region of Idaho, by curtailing the supply, may have had some influence in upholding prices, but not very much. It should be remembered that under the present advanced methods of lead smelting for the precious metals much less lead is required and used in the furnace charge than was the custom formerly. The lead districts east of the silver-lead smelting country, like the lead mines of Missouri, Kansas, Wisconsin, etc., do not add to their former rate of production, and latterly the imports of silver-lead ore from Mexico have considerably fallen of. Whatever effect the chances of free silver-lead ores, or free metallic lead imports, might have has been long since discounted—being allowed for as long ago as the November elections of last year. On the other hand, the steadily increasing consumption is in favor of better prices, one important new demand being for lead pipe coverings to underground electric wires. At the beginning of the preseot year the stocks of lead at New York, Chicago and San Francisco were reported as unusually light. Since then they caonot have increased mucb.

Silver.

Silver has shown decided strength during the week both lo London and New York. The advance in London Tuesday was 1¼d, and in New Ynrk the galn has beeo 3½ cents for the week.

Trade In Quicksilver.

The receipts of quicksilver at this port during July and for the first seveo months of the present year compare with preceding years as follows:

	For. July.	Jan. 1 to July 31.
1891, flasks	1,289	8,333
1892	1,539	11,216
1893	1,638	14,513

Exports by sea from San Francisco during last month were 1081 flasks, including 750 to New York, 169 to Mexico, 112 to Central America, and 50 to Australia. Exports hy sea for the first seven months of the year were as follows:

	Flasks.	Value.
New York	6,450	$261,050
Australia	650	26,825
New Zealand	67	2,649
Central America	284	11,386
Mexico	2,603	108,378
British Columbia	6	236
Canada	280	11,200
Totals	10,340	$421,751
In 1892	5,546	230,235

The shipments overland in the first six mnnths of the year were 4632 flasks.

The Coinage for July.

The several Mints of the United Slates coined during the month of July all the styles of coin known to the American system except four. The aggregate coinage for the month and since January 1, 1893, was as follows:

	For July.	Jan. 1 to July 31.
Double Eagles	$10,000	$10,298,760
Eagles	220,000	4,952,220
Half Eagles	15,000	1,390,120
Quarter Eagles	75,000	75,132
Standard Dollars	.....	1,455,465
Half Dollars	.....	535,733
Half (Columbian) Dols.	.....	2,026,052
Quarter Dollars	33,000	1,558,550
Quarter (Columb'n) Dols	.....	10,006
Dimes	.....	470,046
Five Ceots	23,000	380,463
Cents	15,000	281,213
Totals	$391,900	$23,433,760
Io 1892	2,018,000	29,814,402

San Francisco Metal and Coal Market.

ANTIMONY.		STEEL.	
Per lb	— @ 14	Englisb, lb	— @ 18
BORAX.		Canton tool	— @ 8½
Refined, in car lots	— @ 7½	Bl'k Diam'd tool	8½@ 15
Powdered, do	— @ 7½	Pick & Hammer	6½@ 10
Concentrat'd, do	— @ 8½	Machinery	4 @ 5
All grades jobbing at advance.		Toe Calk	— @ 4½
COPPER.		TINPLATE.	
Bolt	22 @ —	B. V. steel grade	
Sheathing	22 @ —	14x20, spot	— @ 5 87½
Ingot, jobbing	— @ 14½	Do, wholesale	— @ 5 87½
Do, wholesale	— @ 13½	Charcoal, 14x20	— @ 5 87½
Fire Box Sheets	22 @ 24	Do roofing, 14x20	— @ 5 87½
IRON.		Do, do, 20x28	— @11 75
Bar, base	— @ 3	PIG TIN.	
Norway, base	— @ 4½	Spot lb	— @ 24
PIG IRON.		COAL.	
	Spot.	SPOT FROM YARD—PER TON.	
Eglinton ton	20 00@— —	Wellington	$8 00
Glengarnock	21 00@— —	Greta	7 50
Am. Soft, No, 1	23 00@— —	Nanaimo	6 50
Shotts No 1	23 00@— —	Gilman	6 00
Puget Sound	20 00@— —	Seattle	6 50
Clay Lane White	21 00@— —	Coos Bay	5 50
Langloan	22 50@— —	Cannel	8 50
Gartsherrie	22 50@— —	Egg, hard	12 00
Barrow	22 50@— —	Scotch Splint	8 00
Cargofleet	23 00@— —	Brymbo	7 50
CHROME IRON ORE.		West Hartley	8 00
Per ton	10 00 @— —	TO LOAD—PER TON.	
LEAD.		Australian	6 37@— —
Pig	— @ 4¾	Liverpool Steam	6 50@— —
Bar	— @ 5½	Scotch Splint	00@— —
Sheet	— @ 7½	Cardiff	5@— —
Pipe	— @ 6¾	Lehigh Lump	11 00@— —
SHOT.		Cumberland	12 00@— —
Drop, sizes *smaller* than B, bag of 25 lbs	$1 80	Egg, hard	10 00@— —
Do do, B and *larger* sizes bag of 25 lbs	2 00	West Hartley	7 50@— —
Buck, Balls and Chilled do, bag of 25 lbs	2 00	COKE.	
QUICKSILVER.		English, to load	$9 50@10 00
Home trade, pr. flask	40 00 @40 50	Do, spot, in bulk	—@10 00
		Do, in sacks	—@11 50
		Cumberland	9 50@— —

Silver and the Metals.

NEW YORK, Aug. 24.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.	Copper.	Lead.	Tin.
Thursday	33½	72½	9 50	3 32½	18 50
Friday	33¾	73	9 65	3 37½	18 50
Saturday	33¾	73½	9 65	3 37½	18 60
Monday	34	74	9 60	3 37½	18 65
Tuesday	34¾	75½	9 60	3 37½	18 70
Wednesday	34⅞	75⅞	9 60	3 45	18 75

Mining Share Market.

SAN FRANCISCO, August 24, 1893.

After a quiet week lo the stock market Comstocks opened up much improved Monday morning. Much higher car and battery assays of ore taken from the Consolidated California and Virginia and Potosi mines last week counteracted the effect of the news that the Comstock miners and mechanics had refused to accept any reduction in their wages. The improvement has continued through the week, and yesterday sales were the largest for some time. During yesterday forenoon Consolidated California and Virginia sold at as high as $1.40, Ophir 70 cents and Potosi 65 cents, with proportionate gains in the others. Afterward, when certain holders tried to secure the small profits that were lo sight, the market became weaker and closed at a decline of 5 to 10 cents. The miners' uotoos of Virginia City and Gnld Hill will hold a meeting to-night, at which the wages question will again be taken up. H. M. Yerington, president of the Virgioia & Truckee railroad, has beeo invited to meet the miners, and he will do so although he may not attend the meeting.

The miners are said to he willing to accept a reduction of 50 ceots per day io their wages, which would bring them dowo to $3.50, if they have assurance that the rates for wood, lumber, water, transportation and the salaries of officials bave also beeo reduced to the extent agreed upon. It is likely that an offer from them to work for $3.50 per day will be accepted.

The application of the Granite Hill Gold-Mining Compaoy for listing at the San Fraocisco Stock and Exchange Board has been favorably reported on, and the stock has beeo placed upoo the regular list.

The Teirakoff Mining Company of Amador county has levied ao assessment of one ceot per share, delinquent September 28th.

The application of the Gray Eagle gold mine for listing at tbe Sao Francisco Stock aod Exchange Board has beeo favorably reported upon, aod its shares are now on the regular list.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, August 24, 1893.

9:30 A. M. SESSION.

100 B & B	60c	100 Ophir	65c
1000 Challar	20c	50 Potosi	55c
450 Con. Cal. & Va	1.25	150 Sierra Nevada	30c
100 H & N	55c	100 Y Jacket	40c
400 Kentuck	10c	400	35c

Pacific Stock Exchange.

9 AND 10:15 A. M. SESSIONS.

100 Andes	16c	150	23c
200 Best & Belcher	58c	200	21c
500 Caledonia	50	300 Mexican	55c
200 C C & V	1.25	100 Ophir	58c
400 Challar	25c	50 Savage	35c
700	24c		

2 P. M. SESSION.

50 Best & Belcher	55c	100	28c
150 C. C. & Va	1.25	200 Ophir	55c
100 Crown Point	30c	50 Union	35c

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ASSESSMENTS.

COMPANY AND LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T AND SALE.	SECRETARY.
Alhambra M Co, Nev	17	25c	July 14,	Aug 18, Sept 11	F S Schwarze, 324 Washington
Alpha M Co, Nev	60	25c	July 31,	Sept 4, Sept 25	E B Holmes, 309 Montgomery
Alta M Co, Nev	43	15c	April 25,	Aug 21, Sept 8	L Osborn, 309 Montgomery
Belcher M Co, Nev	46	25c	July 31,	Sept 4, Sept 25	C L Perkins, Mills Bldg
Bodie Cons M Co, Cal	18	15c	July 24,	Aug 28, Sept 25	M E Willis, 309 Montgomery
Bulwer M Co, Cal	8	10c	July 29,	Aug 31, Sept 22	L Osborn, 309 Montgomery
Carmelo Land and Coal Co, Cal	6	$4	July 21,	Sept 1, Sept 20	R McDoble, Mills Bldg
Challar M Co, Nev	35	10c	July 31,	Sept 8, Sept 26	C E Elliott, 309 Montgomery
Clinton M Co, Cal	2	15c	Aug 9,	Sept 18, Oct 2	O E Gunn, Mills Bldg
Confidence S M Co, Nevada	23	25c	Aug 7,	Sept 11, Oct 2	A S Groth, 414 California
Eclipse M Co	5	2c	July 27,	Sept 4, Sept 25	O Tum Suden, 216 Bush
Evening Star M Co, Cal	10	1c	Aug 9,	Sept 12 Sept 30	J J Scoville, 320 Sansome
Exchequer M Co, Nevada	30	10c	June 29,	Aug 31, sept 21	C E Elliot, 309 Montgomery
Gold Mountain M Co, Cal	8	$14	July 13,	Aug 16, Sept 4	J F D Curtis, 325 Montgomery
Gray Eagle M Co, California	33	3c	July 10,	Sept 6, Oct 4	Chas G Harvey, 309 Montgomery
Herold M & M Co., California	6	15c	Aug 10,	Sept 16, Oct 3	M E Willis, 309 Montgomery
Inyo Marble Co, Cal	21	5c	Aug 8,	Sept 12, Oct 12	W W Sargeant, Mills Bldg
Jackrabbit M Co, Cal	4	5c	Aug 10,	Sept 15, Oct 6	Thos Wetzel, 320 Sansome
Justice M Co, Nev	55	10c	July 31,	Sept 5, Sept 25	R F Kelly, 309 Montgomery
Kentuck Cons M Co, Nev	6	10	July 11,	Aug 15, Sept 5	A Waterman, 309 Montgomery
Lady Washington M Co, Nev	9	10c	April 18,	Aug 9, Aug 30	L Osborn, 309 Montgomery
Mexican M Co, Nev	48	25c	July 17,	Aug 22, Sept 12	C E Elliott, 309 Montgomery
Occidental Con M Co, Nevada	13	10c	June 22,	Aug 16, Sept 6	A K Durbrow, 309 Montgomery
Ophir M Co, Nev	60	25c	July 31,	Sept 4, Sept 25	E B Holmes, 309 Montgomery
Potosi M Co, Nevada	38	25c	July 11,	Aug 15, Sept 5	C E Elliott, 309 Montgomery
Sag Belcher and Mides Con M Co, Nev	12	10c	July 25,	Aug 29, Sept 18	E B Holmes, 309 Montgomery
Sierra Nevada S M Co, Nevada	105	20c	Aug 2,	Sept 6, Sept 25	E L Parker, 309 Montgomery
South Eureka M Co, Cal	5	15c	Aug 2,	Sept 4, Sept 29	A Halsey, 328 Montgomery
Teresa M Co, Mex	11	10c	Aug 3,	Sept 11, Sept 27	K J Willats, 309 Market
Ventura Asphalt Co, Cal	1	50c	July 11,	Aug 26, Sept 18	F A Brooks, Monadg'k Block
Waterloo G M Co, Cal	1	15c	Aug 2,	Sept 6, Sept 25	J M Bailey, 18 Post
Yellow Jacket M Co, Nev	55	25c	July 29,	Sept 5, Oct 9	W H Blanvelt, Mills Bldg

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Arnold G & S M Co, California	Annual	A Judson, 320 Sansome	Sept 5
Cal Land & Dev Co	Annual	D E Newell, 212 Sansome	Aug 26
Hidden Treasure M Co	Special	R B Jones, 144 Phelan Building	Sept 4

DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE
Bulwer Cons M Co, California	5	L Osborn, 309 Montgomery	Oct 20
Champion M Co, California	10	T Wetzell, 310 Pine	May 15
Cons New York M Co, Nevada	10	C E Elliott, 309 Montgomery	Feb 15
Great Western Quicksilver M Co	25	A Halsey, 328 Montgomery	Oct 8
Mayflower Gravel M Co, California	10	D M Kent, 330 Pine	Juoe 30
Pacific Coast Borax Co., California	1 00	A H Clough, 230 Montgomery	Jan 10
Standard Cons M Co., California	10	J W Pew, 310 Pine	July 25

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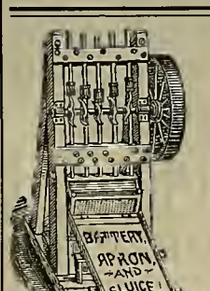

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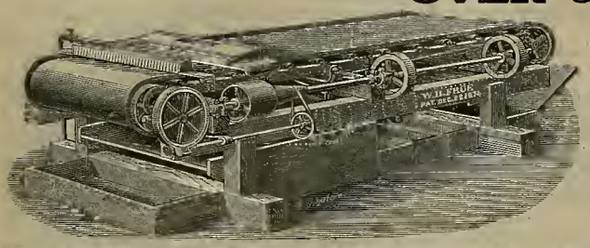

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GLADSTONE MINING COMPANY, C. J. Clark, M. E. Gen'l. Supt. FRENCH GULCH, Calaveras Co., Cal., Dec 12, 1891.

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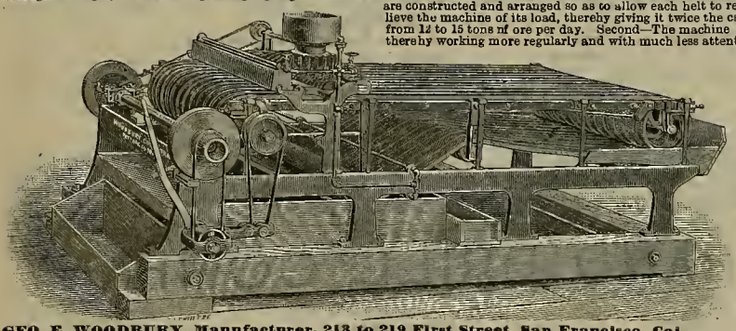

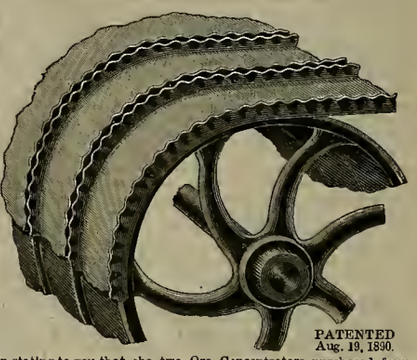

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Eureka Tellurium Gold Mining Company, Redding, Cal., July, 21, 1893.—Mr. Geo. E. Woodbury, 213 First St., San Francisco, Cal.—Dear Sir:—We take pleasure in stating to you that the two Ore Concentrators purchased from you last April are giving perfect satisfaction. They are simple, durable and effective, and we hereby conscientiously recommend the "Woodbury" pattern to all intending purchasers of Ore Concentrators. Yours truly,

[Signed] EUREKA TELLURIUM GOLD MINING CO., by GEO. O. JONES, Secretary.

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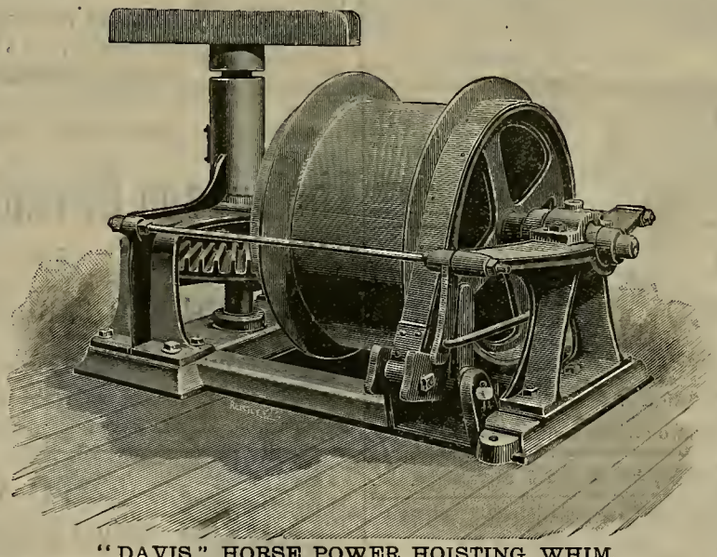

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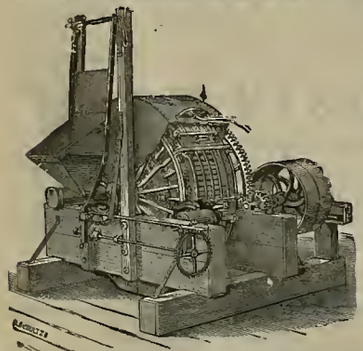

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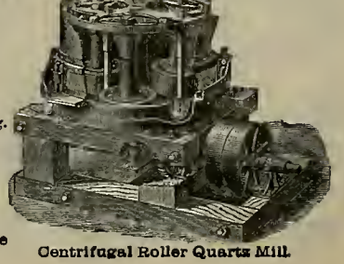

Centrifugal Roller Quartz Mill.

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An Illustrated Journal of Mining, Mechanics and Popular Science.

VOL. LXVII.—Number 10.
DEWEY PUBLISHING CO.

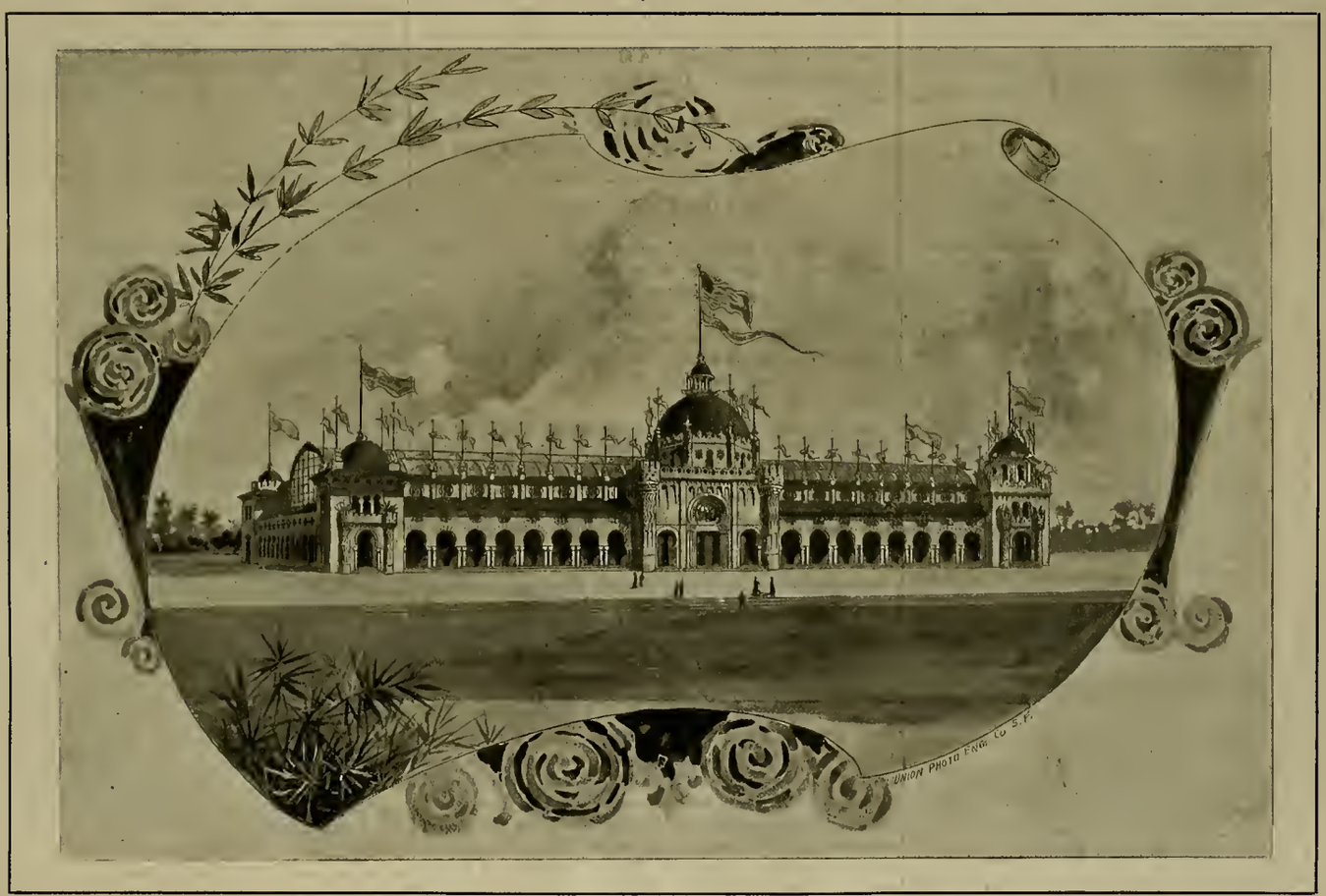
SAN FRANCISCO, SATURDAY, SEPTEMBER 2, 1893.

Three Dollars per Annum.
Single Copies, 10 Cents.

The Midwinter Fair.

Ground was broken last week for the Midwinter Fair, the occasion being marked by appropriate exercises and by tremendous attendance on the part of the people of of San Francisco and neighboring cities. The credit and good name of the city are now pledged before the world to make the fair a success, and there appears to be no donbt that every possible effort in that direction will be made. The arrangements of the management are being made on an elaborate scale, and enough money has been subscribed to afford a sufficient guaranty that the fair is a "go." Too much cannot be said of the desirability and importance of the enterprise. Expressions from coast cities have been of a most encouraging nature; and have shown that interest and sympathy have been excited among people of all classes. The East, too, looks on the project with an approving eye, and promises to send large numbers of visitors across the continent to visit the exhibition and incidentally to enjoy the charms of climate and scenery California will extend them. Intending exhibitors have applied for space in such large numbers that the management is already confronted with a serious question as to what shall be done to accommodate all.

It is proposed to erect five buildings in Golden Gate Park. The plans of four have already been chosen from a competitive display of architects' drawings. The illustration on this page is of the Manufactures and Liberal Arts building, reproduced from the first number of the *California Midwinter International Exposition Illustrated*, the authentic journal of the fair. It is the largest of the five structures and was designed by Mr. A. Page Brown, who was the architect of California's attractive building at Chicago. It is of Moorish design, 450 feet long and 250 feet wide, its height being 55 feet. It has all the picturesqueness that is so readily obtainable in this style of architecture, and with the collonade which surrounds it, and its towers, will introduce the various forms so popular in the mission buildings. Roof gardens will be found in the loggias of the towers. The roof will be covered with curled metal tiles, and a skylight, and the building will be lighted as well from the sides. The building will be constructed of wood, plaster and cement. The exterior will be a creamy white, with the red roof in striking contrast, and in the corridors more glowing colors will be introduced. The estimated cost of the building complete is $105,000.



MANUFACTURES AND LIBERAL ARTS BUILDING OF THE MIDWINTER FAIR.

The opinion is general among those best acquainted with legislation that no change in the essence of the Caminetti law will be made until its provisions have been thoroughly tested and it is satisfactorily demonstrated that it will or will not accomplish the objects for which it was enacted. There may be some corrective legislation, but probably none that is vital or of very great importance. In view of these circumstances, it seems to us that miners should make the best of the situation and start idle mines wherever practicable. It may be true that hydraulic mining will be more expensive than before; but it is also true that gold is actually worth more than it has ever been. The profits of hydraulicking will be less than under former conditions; but there is no important branch of business that does not run on closer margins than ever before. California badly needs the output of the hydraulic mines. They can immensely swell the permanent wealth of the State. They can give employment to many idle men. If it is possible to obtain a license to mine under the law it should by all means be done.

Senator Sherman is no friend of silver, but he is nevertheless placed in the attitude of defending the Sherman silver-purchase law. He frankly declares that the heavy silver purchases by the Government are not responsible for the present monetary evils. But the real cause is the fact that England required us to pay our debts in gold when the balance of trade was against us. Further, when England was so badly bitten in the Argentine Republic smash-up, she called in her American securities and required payment in gold in order to maintain her own institutions. All of which goes to show that silver did not drive gold from the United States.

Secretary Carlisle has ordered that the United States mints at Philadelphia and San Francisco be fully manned and that the full capacity of both mints be utilized in the coinage of gold bullion. The Treasury Department possesses from $85,000,000 to $90,000,000 in gold bullion, which is part of the gold reserve of $100,000,000. Gold bars cannot be used as currency, so it has been decided in the time of the present need to coin the bullion,

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San Francisco, September 2, 1893.

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WHAT is meant by the gold and silver ratio of 16 to 1? is a question frequently asked. The legal silver dollar consists of 412.5 grains standard silver, the legal gold dollar 25.8 grains standard gold. Both are nine-tenths pure, one-tenth alloy. The silver dollar therefore contains 371.25 (412.5 minus 41.25) grains pure silver, 41.25 grains alloy. The gold dollar contains 23.22 (25.8 minus 2 58) grains pure gold. The weight of silver in one dollar is therefore 15 98 times the weight of gold, or, practically, 16 times the weight of gold. Nominally, 16 ounces of silver and 1 ounce of gold are of the same value. At the ratio of 20 to 1 the silver dollar would contain 464.40 grains of pure silver, or 516 grains of standard silver, and be twenty times the weight of the gold dollar, and silver, when coined, would be worth $1.03 per ounce, or over 26 cents per ounce less than its present value.

FOLLOWING is the vote of the California delegation in the House, last Monday, on the several financial propositions under consideration in connection with repeal of the Sherman law:

On a ratio of 16 to 1: Ayes—Bowers, Cannon, Caminetti, Geary and Maguire. Noes—Hilborn and Lond.

On a ratio of 17 to 1: Ayes—Bowers and Caminetti. Noes—Geary, Hilborn, Lond and Maguire. Cannon not voting.

On the ratio of 18 to 1: Ayes—Bowers, Caminetti, Cannon and Hilborn. Noes—Geary, Loud and Maguire.

On a ratio of 19 to 1: Ayes—Bowers, Caminetti, Cannon, Hilborn. Noes—Geary and Lond. Maguire not voting.

On a ratio of 20 to 1: Ayes—Bowers, Caminetti, Cannon and Hilborn. Noes—Geary, Lond and Magnire.

On the Bland-Allison Act restoration: Ayes—Bowers, Caminetti, Cannon, Hilborn and Maguire. Noes—Geary and Loud.

On the Wilson bill: Ayes—Cannon and Geary. Noes—Bowers, Caminetti, Hilborn, Lond and Maguire.

AUSTIN, Nevada, has a Woman's Silver League which takes an active interest in public affairs and is, of course, for unlimited coinage of silver. Strong silver resolutions were recently passed, and copies sent to Nevada's representatives in Congress, to Mrs. Cleveland and others. Mrs. J. A. Miller is president, Miss Mary Egan secretary of the league, and the resolution committee is Mrs. J. R. Williamson, Mrs. O. J. Clifford, Mrs. Wm. Foster, Mrs. W. J. McGlew, Mrs. Thos. H. Dalton, Miss Katie Laughlin, Mrs. Wm. Easton.

IT is reported that a syndicate composed of J. B. Haggin, John W. Mackay and Senator Jones of Nevada has about concluded arrangements for the purchase of all the gold mines and interests in the Beauce mining district in the province of Quebec. These mines are located about 75 miles north of the city of Quebec, and are known as the Gilbert river gold mines.

THERE is a prospect that the differences as to wages between the owners and employes of the big Bunker Hill & Sullivan mine, at Wardner, Idaho, will be adjusted, and the miners will go to work at a reduced scale.

Silver Not Yet Beaten.

The lower house of Congress last Monday passed the Wilson repeal bill by a vote of 240 to 110, after a debate lasting over two weeks and a determined and spirited fight by the silver men. It was evident from the first that the majority was against them and that they were marching into the teeth of defeat. But they went down with banners flying.

The result can scarcely be said to be either a surprise or a disappointment to the friends of free coinage, as it had been fully realized that they were in a minority in the House. The real test of strength was not to be made there. The action of the Senate, and not the House, will determine the fate of silver. While the large adverse vote of the House will have little or no direct influence on the Senate, it ought to be said that it is an indication that the administration is more powerful than either friends or foes of silver had anticipated. All the power of patronage and promise of spoil was brought to bear upon susceptible members, and all the disadvantage and loss of influence certain to accrue from the assumption of an attitude hostile to the President and his monometallistic allies had their effect with others. The mass of indifferent, doubtful and timid members was therefore arrayed for the Wilson bill, and only the outspoken champions of silver were left against it.

There can be no doubt that the same stealthy influences will be brought to bear on the Senate by the administration, and it is not wise to underestimate their effect. At the same time, silver is unquestionably stronger in the Senate, and has more numerous, able and powerful friends. If the silver men cannot defeat the Wilson bill (or its substitute, the Voorhees bill), there is a strong chance that they may be able to load it with amendments or effect some sort of a compromise. A silver bill passed the Senate at the last session. There is no little prestige in that record.

The battle is not ended. The administration has not yet won. The broken blade only makes the fight the closer.

The Old Fight Again.

It is without doubt the purpose of the Anti-Debris Association to resist the resumption of work by such hydraulic mines as were closed down under the Sawyer decision. Their attorney, R. T. Devlin, makes a covert threat that if any such mines are allowed by the Commission to resume operations, an attempt will be made to bring the constitutionality of the Caminetti law into question. Says Mr. Devlin:

> Our association is not opposed to hydranlic mining in the abstract. We merely desire to protect our own interests. If the Commission protects ns from injnry we have no objection to offer, bnt if their precautions are insnfficient we will contend for the protection laid down as onrs by right under the Sawyer decision. We do not claim any right to go contrary to any Act of Congress, but we also claim that Congress has no right to grant privileges to one class to injure another. That is a fundamental right gnaranteed ns by the Constitntion. I understand that petitions will be filed to operate mines enjoined under the Sawyer Act and under the ssme conditions. Such petitions we will resist before the Commission and elsewhere if necessary. Good faith is an element in this matter. The Commission may lay down good and snfficient regulations which may be violated. We must see that the regnlations are snfficient and then see that they are observed.

The association is not opposed to hydraulic mining in the abstract, but it is in the concrete. That is what Mr. Devlin means to say. An attempt is to be made to open up the whole question anew by protest against the application of the Omega mine, Nevada county. The Anti-Debris Association has already placed itself on record as declaring that impounding works will not impondd, and, inferentially, that the Debris Commission is not under the law able to devise any system of protection that will protect. It doubts the engineering skill of the Commission. It has taken snap judgment on the law before its workings have been tried. The fact is, that the anti-debris people have made up their minds to be dissatisfied with any requirement of the Commission allowing mining to be resumed. In the judgment of the self-styled representatives of the valley interests, the truly ideal condition under which hydraulic mines might be resumed would be a general requirement that no water be used.

As to Impounding Dams.

It is already apparent that some features of the Caminetti law can be revised without altering its spirit or intent. For instance, it appears to have been decided by the Debris Commission that for the present all licensees are to be required to erect restraining dams whether needed or not. In many cases, the location of mines is such that no adverse interests are affected in the dumping of the debris. The Kelly Hill Gold Gravel Company, which will doubtless be granted permission to mine, must erect a dam in Nesbit canyon. The dam is said to be a superfluity, but the expense must nevertheless be incurred.

The Debris Commission should be expressly vested with discretion in the matter of requiring erection of dams. As it is now, the law does not in words and terms require that such works shall in all cases be provided. It makes general provision for impounding the debris by government works at the head of navigable streams; but such reservoirs are not erected, and it may be some time before appropriation is made therefor. In other cases, it is provided, before the grant of the license, that the Commission shall "make an order directing the methods and specifying in detail the manner in which operations shall proceed in such mine or mines; what restraining or impounding works, *if facilities therefor can be found*, shall be built and maintained, etc." If facilities cannot be found, the construction of law by the Commission seems to be that the debris must be impounded in the government works; and, if there are no such works, and no facilities are found, license shall not be granted. At any rate, it is deemed wise by the Commission to be on the safe side. It is certainly within its prerogative to require impounding works. It may not be to allow mining in certain cases without such works.

IT is probable that the Senate, in the discussion over unconditional repeal of the purchase clause of the Sherman Act, will attempt to substitute for the Wilson bill another measure by Senator Voorhees, Chairman of the Finance Committee. The Voorhees bill repeals the purchase clause, but contains a pledge for bimetallism, declaring it to be the policy of the United States to continue the use of both gold and silver as standard money and to maintain their parity. The equality is to be secured through international agreement or by other legislation. There is no substantial difference between the Wilson and Voorhees bills. The bimetallic declaration of the latter amounts to nothing and is not binding upon anybody or anything. It means just as much as the pretty double-standard utterances of the Chicago and Minneapolis platforms, which seem to have been designed for use before election only.

CHARLES WARD, a prospector, puts forward the interesting, if not convincing, claim that the great Mother Lode extends south through Fresno county and even to a greater distance in that direction. Mr. Ward says that he has traced the formation four miles in what is now Madera county, making seven locations. These locations have been developed and other openings have been made until now there are some 16 workings on the Mother Lode in the vicinity of Grub Gulch, 14 miles from the Raymond Railway branch. Mr. Ward shows specimens of the rock from these workings that illustrate the character of the mineral deposit. The lode is capped, he says, with an unfavorable-looking sugary quartz, which merges gradually into a fine and rich gold-bearing rock, bearing the precious metal in particles large enough to be visible with the naked eye. The vein, he states, is from 5 to 35 feet in width, and has improved in quality in every shaft as it deepens.

THE gold mines of Nevada county are attracting renewed attention, and the activity of that section is more marked than for a number of years. Nevada City and Grass Valley show more life than most towns in the State of the same population; and the various mining camps have assumed an air of spirit and prosperity that argues well for the future. The hills are full of prospectors, new mining enterprises are being undertaken, idle mines revived, and the days of old and the days of gold appear to have returned in earnest. Better than all, the old reliable mines continue right along in business at the old stand and declare dividends with unfailing regularity. Nevada seems destined to continue in the lead of gold-producing counties of the State. May its namesake soon find also that the silver clouds have a gold lining!

JAMES LEFFEL & Co., Springfield, Ohio, are the manufacturers of the turbine wheel to be used at Niagara Falls, described at length in the PRESS two weeks since. Through inadvertance the name of the makers was omitted. The performance of the wheel was so satisfactory that Messrs. Leffel & Co. have been directed to make an exact duplicate of 1100-horse power. Shipment will be made soon and the application of horse-power made at once.

FOLLOWING the defeat of silver in the House the Carson *Appeal* calls for the impeachment of the President for bribing Congress with promises of patronage, and closes a bitter editorial by saying: "The Goddess of Liberty, which has been farmed out to the highest bidder for years, has now fallen so low that she has become the common strumpet of Wall street."

The First Application.

The public hearing on the first application for license to mine by the hydraulic process under the Caminetti law was held by the California Debris Commission in this city Tuesday, August 29th. State Commissioner Kidder was present and sat with the Federal board. The applicants were Messrs. R. M. Mooer and J. C. Boyd of Butte county. The public proceedings were very brief and hardly gave a sufficient indication of the real importance of tbe occasion, wbich was a part of the first formal step by miners toward tbe resumption of hydraulic mining in the State. The applicants were present in person and by attorney, W. M. Pierson, and the Anti-Debris Association was present by its attorney, R. T. Devlin, and by a prominent member, Geo. Obleyer. Tbe anti-debris people were simply on hand in conformance with their well-known policy of watching tbings and to learn in just wbat manner and under what auspices the law was to be put in operation.

Lieut. Col. Benyuard briefly stated the purpose of the session, and the following documents were read by the secretary, Major Heuer. They are given in full for the purpose of indicating in what manner tbe rules and requirements of the debris commission in making applications are to be complied with:

SAN FRANCISCO, July 21, 1893.

Major W. H. Heuer, Hydraulic Commissioner.—DEAR SIR:—In accordance with tbe instructions set forth in your circular for a permit to erect and operate a hydraulic property, we beg leave to submit the following for your and your associates' approval, believing that we have fully set forth and explained in a clear and comprehensive manner, questions propounded or set forth in your circular. Hoping they may prove satisfactory, we most respectfully ask you to grant us, at your earliest convenience, a permit to erect and operate a hydraulic on the Kelly Hill Gold Gravel Mining property.

Yours very respectfully,
R. M. MOOER.
J. C. BOYD.

KELLY HILL GOLD GRAVEL MINE.

The Kelly Hill Gold Gravel Mining property is situated between the towns of Centerville and Nimshew, distant by a good road about 17 miles in a northeasterly direction from the town of Chico, and about 210 miles from the city of San Francisco.

The property is located in Centerville and Helltown Mining District, in sections 27 and 28, township 23 north, range 3 east, Mount Diablo meridian.

The ground to be worked by hydraulic is 1600 feet in length, average width of 250 feet, and average depth of about 75 feet; fall from upper end of ground to be worked to Big Butte creek, 1100 feet; fall from point where work will be commenced to Big Butte creek, about 700 feet.

The average width of Nesbit gulch to be used as dump, 800 feet; average depth of Nesbit gulch, as dumping ground, 75 feet; length of Nesbit gulch from point of commencement of work to where it empties into Big Butte is about 5000 feet.

The average width of Brewer gulch to be used as dump, 1000 feet; average depth of Brewer gulch as dumping ground, 75 feet; length of Brewer gulch from upper end of dump to where it intersects with Big Butte creek is over 5000 feet; size pipe to be used to convey water from pen-stock to monitor, will be 15-inch, 18-inch and 20-inch; fall or pressure of water, from pen-stock to monitor, about 330 feet; the quantity of water to be used, 500 inches; drainage of water will be into Neshit and Brewer gulches, thence into Big Butte creek. Character of gravel to be worked consists mostly of what is termed as flat wash and ancient channel wash. Source of water supply will be taken from Spring Valley ditch, which is taken from Big Butte creek. Size of ditch, four feet wide on top, two feet on bottom, two and one-half feet deep. Length of mining season 12 months in the year. Ground to be worked 20 hours daily when not interrupted by inclement weather or breakdowns. Grade of sluices, one inch to one foot; size of sluices, three feet wide, two feet deep; amount of ground to be washed per hour will be from 8 to 12 cubic yards, which will be owing to the compactness of the ground. Should cemented ground be encountered much less ground would be washed per 24 hours.

Either the Neshit or Brewer gulches has ample dumpage facilities for holding double the amount of debris contained in the ground proposed to be worked off by hydraulic, none of which will enter Big Butte creek. There is the best of facilities for erecting restraining dams of rock, should they ever be required.

The map accompanying this report will fully show the situation and size of the ground to be worked by hydraulic; also the gulches to be used as dumping ground and their outlets into Big Butte creek, location of buildings, etc., etc.

To reach the Kelly Hill mining property take the Oakland boat at either 8 o'clock A. M., or 7 o'clock P. M. for Chico, distant from San Francisco to Chico by Oregon railroad 193 miles; from Chico to Kelly Hill, either by stage or private conveyance, 17 miles. Stages leave Chico on Sundays, Tuesdays and Thursdays.

Hoping the foregoing description of the property and the plan for fitting it up for active hydraulic operations, and the great advantage for dumps and impounding of tailings, will fully meet your views, for granting us a permit for working the same by hydraulic process.

Yours very respectfully,
R. M. MOOER.
J. C. BOYD.

THE SURRENDER.

To the Honorable the California Debris Commission:

The petition of R. M. Mooer and S. C. Boyd, residents of the State of California, respectfully shows:

That they are the proprietors of those certain hydraulic mining claims known as the Warren mining claim and the Fricker mining claim, situated in the Helltown and Centerville Mining District, Butte County, State of California, and originally known as the Kelly Hill Gold Gravel Mining property, situated in sections 27 and 28, township 23 north, range 3 East, Mount Diablo meridian.

That they are desirous of working said claim by the hydraulic process.

That they hereby surrender to the United States the right and privilege of regulating by law, as provided for in the Act of Congress approved March 1, 1893, or any law that may hereafter be enacted, or by such rules and regulations as may be prescribed by virtue thereof, the manner and method in which the debris resulting from the working of said mines shall be restrained, and what amount shall be reproduced therefrom.

It is understood, however, that the surrender, as aforesaid, shall not be construed as in any way as affecting the right of such owners to operate said mines by any other process or method now in use in said State, provided, however, that said proprietors shall not interfere with the navigability of any of the rivers mentioned in said Act of Congress.

IN WITNESS WHEREOF, your petitioners have hereunto set their hands and seals this 4th day of August, 1893.
R. M. MOORE.
J. C. BOYD.

When these documents had been read, Col. Benyuard asked if there were any others who wished to be heard for or against the grant of the petition. Attorney Devlin announced that the Anti-Debris Association had no objections to offer, but that two applications for license were to be heard next week to one of which the Anti-Debris Association would make formal objection.

He wanted to know when the necessary papers should be filed, and was informed that they must be handed in previous to the hearing. It is understood that a fight will be made on the application of N. C. Tully for permission to mine in the Omega Mining District, Washington township, Nevada county. The mine had been shut down by order of the court.

This closed the public hearing. The Commission afterward met with Messrs. Mooer and Boyd and inquired particularly of their plans, intentions, etc. The applicants were directed to prepare plans for a restraining dam and submit to the Commission. If the plans are approved, license to mine will be granted in due form.

ARIZONA shares in a large degree the general activity that has recently marked gold mining enterprises. Time was when no prospector would trouble himself with a ledge of gold-bearing quartz that assayed less than an ounce to the ton on the surface. Silver mining offered greater inducements. But things are changed. Neglected prospects are now being developed, and in many places paying ore bodies have been opened up. The gold output of Arizona will no doubt be heavily increased in future, and it is not too much to anticipate that its value will in time exceed the loss from the depreciation of silver. One trouble with Arizona is that it has been too modest about its own fine resources and has not sufficiently counteracted a general impression in the East that its chief products are cacti and cowboys. When the cheap humorist who is circulating the Arizona *Kicker* fiction dies, or he is otherwise providentially incapacitated from libeling a progressive, honest and honorable people by further publication of his malicious nonsense, Arizona will have a chance to be known for what it is really worth.

THE MINING AND SCIENTIFIC PRESS this week contains the full text of Admiral Selwyn's Zymean process of ore reduction, with a full review by the editor of this paper. We conceive it to be our duty to tell the truth about any project or process having for its object the welfare of the miner; and it is no less our duty to expose fallacies and correct errors of schemes which wrongfully pretend to open a new, easy and economical way of ore reduction. The task in this instance has been especially unpleasant, inasmuch as Admiral Selwyn is a gentleman of high character, undoubted integrity and honest purpose; and he thoroughly believes in the practicability of his method of ore reduction. If it were feasible, we should bail it with satisfaction and do all in our power to present it properly and fully to the miners. But it is not practicable, and we have endeavored to show clearly wherein and why it is not.

ACCORDING to a recent dispatch, Baker City, Or., has just received from Sloan & Haskell's diggings one gold nugget weighing $375, and a number worth over $100. The output amounts to $5000, the result of 30 days' run. The ground worked was 65 feet wide and 145 feet long, the average depth being 15 feet.

Foundry Notes.

THE Union Iron Works is preparing a twenty-stamp mill for a mine in Sierra county.

THE Government steamers McArthur and McDowell are undergoing repairs at the wharf of the Fulton Iron Works.

THE Union Iron Works has shipped to Nevada county machinery for a new mill for the Champion Mining Company. The plant weighs 22 tons.

THE foundries are engaged largely in repair work and the general run of smaller orders. Hard times are complained of, but there is nevertheless a fair amount of activity among them.

THE California Wire Works have just finished a 1¼-inch cable for use on the Oak-street branch of the Omnibus Cable Company's system. Its length is 14,240 feet, and its weight 36,474 pounds, or over 18 tons.

THE Spring Valley Water Works has placed an order with the Fulton Iron Works for a large pumping plant, supplementary to its present system. Its capacity will be 3,000,000 gallons in 24 hours under 400-foot head; weight, 200 tons.

THE Fulton Iron Works is engaged in filling two orders for mining machinery, destined for Mexico. One is for a hoist, dry crushing mill, and leaching plant; the other a hoist with boiler, air receiver and general mining plant. Work is also going forward on a water-power hoist and pumps for a mine near Chico.

THE Union Iron Works is putting the finishing touches on the big cruiser Olympia. Steam was gotten up last Monday and the cruiser moved for the first time by the impetus of her own machinery. She steamed ahead and then astern as far as the play of her hawser would permit. These little pendulum trips were continued for some time. Tuesday and Wednesday the cruiser steamed around the bay, and every part of her machinery was thoroughly tried. The tests were private. The official trip will no doubt be made within the next few weeks.

Tailings.

THE steamer Bertha last week brought down $65,000 in dust and nuggets from the Alaska mines.

MATTHEW RAPSON AND THOMAS JENKINS, miners well known on tha Comstock, died last week, both of miners' consumption.

FOUR million dollars in gold coin have just been shipped by Superintendent Daggett from the United States Mint in this city to New York.

HAYWARD A. HARVEY, inventor of the Harveyized steel armor plates and roller screw, died at Orange, N. J., Monday, from kidney trouble.

THE Idaho mine, Nevada county, has declared another dividend, the amount being $2 per share on the capital stock. This makes 276 dividends paid by that mina.

WORK on the rich Bassick mine in Colorado was suddenly stopped recently by the discovery of a human skeleton 600 feet below the surface. The terrified miners believed the place to he haunted.

THE Amador *Dispatch* has concluded its thirty-fourth volume, and contemplates extensive improvemants. The *Dispatch* grows better as it grows older, and seems destined for a long career of usefulness.

E. G. SMITH, of Auburn, well known in mining circles, is in the city on his way to Seward City, Alaska, where he is to be employed by the Nowell Gold Mining Company. Mr. Smith is 72 years old, but he intends to grow up with the country, just the same.

AT a meeting of miners held at Redding, tha following telegraphic memorial was ordered sent to Congressman Geary at Washington: "We respectfully request that you use your best endeavors to rehabilitate silver as money before the repeal of the Sherman act."

THE Empress of India Mining Company has been incorporated at Spenceville, Nevada county. The capital stock is $1,000,000, all of which has been subscribed. Directors—I. L. Hoffman, M. Sondheimer, Emil Woenne, Chas. Pietsch, C. C. Bitner, Meyer Rosenthal and I. L. Rosenthal.

THE Eastern Star G. and S. M. Co. have filed articles of incorporation in Nevada county. The directors are: Frank E. Dennen, Elam Biggs, Geo. Vincent, D. N. Coffin and P. H. Paynter, all of Grass Valley. The capital stock is $1,000,000, divided into 100,000 shares at the par value of $10 each.

ALASKA is getting out a good deal of gold this year. There are 300 or 400 miners on the Yukon, or rather on its branches, Forty-mile creek and Sixty-mile creek. A trading post has been established at Forty-mile, so that it is no longer necessary for miners to freight their supplies up on sleds.

ARTICLES OF INCORPORATION of the Kate Hayes Hill Mining and Milling Company have been filed with the Nevada county clerk. Principal place of business, Grass Valley. Directors—John F. Cooper, W. M. Treloar, W. Macdonald Blair, John C. Roberts, W. E. Parsons. Capital stock, $100,000.

THE Diamond Mining and Development Co. have filed articles of incorporation with the Secretary of State. The directors are: Edward B. Thomas of Sacramento, John C. King, John R. Avis, F. T. Van Fleet and John J. Avis of Sacramento. The capital stock is $100,000, divided into 100,000 shares of $1 each.

NEVADA COUNTY, and Grass Valley in particular, is about to witness such an era of prosperity as has never before been known, says the *Transcript*. Every day or so new companies are being formed to develop old mines which are known to have merit, or new locations which are favorably situated for developing gold producers.

A BIG silver meeting was held at Eureka, Cal., last week, and the following resolution was ordered telegraphed to Congressman Geary: "*Resolved*, By the people of Humboldt county, in mass meeting assembled, that our representatives in Congress should oppose, by all honorable means, the repeal of the purchasing clause of the Sherman act, without substituting therefor the free coinage of silver at a ratio of 16 to 1."

THE Colfax *Sentinel* says: The North Fork of the American river is alive with men, all seeking their fortune. A couple of weeks ago some of the Gold Run boys went down to work on the river. They are organized as the "Hard Scrabble Miners of Pickering Bar." Monday morning another company, known as the "Rock-Me-Out Company" of Dutch Flat, under the leadership of Sim Jordan, went down to get out more gold for the market. H. Miner is at work on the "Never Sweat Bar." A. Beebe is working on the "Make-Me-Quick" claim, and W. H. Kinder and son are running the "Oh-Be-Joyful" claim.

THE Hancock Mining company has been incorporated with 100,000 shares of stock at a par value of $1 per share. The company organized with the following directors: Jackson Dennis, president; J. Nichols, secretary; W. D. Chambers, superintendent; John Brown and C. O. Mitchell; 30,000 shares of the stock have been taken in Amador City. The company proposes to sink a shaft 300 feet, says the Amador *Ledger*, about 25 feet from the ledge, and crosscut to the ledge and then drift both north and south. A water hoist is already contracted for and work will be commenced immediately. The ledge on the surface is from five to seven feet wide and shows $5 per ton in free gold.

ARTICLES of incorporation of the Horseshoe Mining Company have been filed at Grass Valley. The mine is to be incorporated with 100,000 shares, of the par value of $1 per share, with the following named gentlemen as directors: J. F. Cooper of Sacramento, T. R. Cooley, J. W. Rumsey, George Enright, Wm. Provis, Jr., of Grass Valley. The Horseshoe mine is situated on Wolf creek, below the Omaha mine and is owned by the Horseshoe Gold and Silver Mining Company, who have bonded the mine to the above company. The new company intends to push right ahead with the development work, as they are confident they have a good mine.

THE lessees of the Succor mine, Gold Hill district, Nevada, claim to have discovered that the Justin and Silver Hill mines have been working their ground. For several years prior to the suspension of operations in the Justice, that mine was producing steadily more than 300 tons of ore weekly, according to the reports of the superintendent, most of which Longabaugh the owner, alleges was stolen from Succor ground, the bullion proceeds of which is roughly estimated to exceed $1,000,000. Longabaugh has applied to the District Court for an order for an underground survey of the Justice and Silver Hill workings

to ascsrtain ths number of tons of ore extracted from ths Snccor by those companies as preliminary to entering suit against them to recover ths amount of the bullion ths ore produced.

DURINO the latter part of the present month (Angnst), says ths Virginia *Chronicle*, the Comstock mining companies have shipped a largsr amonnt of ors to the river mills for rednction than for a long period of tims prsvions. Most of the ors shipped is from ths Gold Hill mines. The ore is milled at the Msxican, Santiago and Brnnswick mills on the Carson river. Last Wednesday the V. & T. railroad transported 25 loaded dumps to ths river mills; on Thursday the same numbsr, and yesterday 39. To-morrow morning a train of 50 carloads of ors will be shipped—14 cars from the C. & C., 12 from the Kentnck, 16 cars of Yellow Jackst ore, and 8 from the Crown Point. The capacity of an ore car is eight tons, bnt the dnmps ars not loaded that heavily. Thirteen cars averags, as at present loaded, abont 104 tons. The V. & T. has on the road 115 ore dnmps, but all are not needed, even dnring the present heavy shipments. Yesterday a donble header bronght in 60 dnmp cars. By ths end of the month the ore bins at the mines shipping rock to the river mills will bs prstty well emptied.

Something About Big Guns.

The largest projectile ever made—if, indeed, any of them have been made—ls that for the Krupp gun now at the Chicago Fair. The projectile for that is four feet long and weighs 2700 to 2800 pounds, writes W. C. Dodge to *Inventive Age*.

The gun itself welghs 248,000 pounds, or 124 tons, ls 46 feet 2 inches long and 6 feet 7⅛ inches at the breech—the largest ever made, though Krupp previously made one or more for Italy that weighed over 118 tons, in 1886, and England some that weigh 100 tons. This Krupp gun will take 700 pounds of powder for a charge and it will cost about $1500 at each discharge. It is estimated that it will pierce 20 inches of steel armor at a distance of 9 miles.

Krupp had a 14-inch gun at the Philadelphia falr, and at the Paris exposition of 1867 he had one weighing 50 tons, 14-inch bore, 17½ feet long, the shell for which weighed 1080 pounds, and the solid shot 1212 pounds. These Krupp guns are made of solid steel and are not built up in sections as are ours and the English guns.

When Gen. Gilmore planted his "Swamp Angel" in front of Charleston the London *Times* ridiculed the idea and said no gnn ever had been or probably ever would be made that could throw a shot five miles. At the queen's jubilee a year or two ago one of thelrs threw a shot 12 miles, and one of our officers made a calculation which was published beforehand of what its flight would be and varied but a few rods from the actual result. It is calculated that some of the guns in existence to-day will throw a shot 15 miles.

Some idea of the tremendous power of the 110-ton gun can be formed when, as is stated, it has thrown a 16-inch steel projectile, 4 feet long, at a velocity of 2079 feet a second, piercing 20 inches of steel and many feet of timber backing. To strike such a blow, it is said, a locomotive weighing 200,000 pounds would have to go at the rate of 135 miles an hour! Persons who have witnessed the effect of a collision with a train moving 30 miles an hour can by that means obtain a faint idea of what the result would be.

Deep Mining in African Reefs.

In the London *Mining Journal* for July 22d there is a long article headed "Progress on the Rand Gold Fields," wherein it is stated: "The workings of the auriferous deposlts of the Witwatersrandt has certainly led to advances in mine management and the treatment of the ores, which it is not too much to say has opened up splendid new vistas for gold mining not only in South Africa but in many other parts of the world. The "main reef" series has been struck at a depth of nearly a half a mile—an event which gives qulte a new aspect to auriferous mining.

"The length of the Witwatersrandt reef is about 40 miles, and at the enormous depth mentioned seems to show that the mlning industry has before it the work of dealing with a gigantlc mass of gold-bearing strata. The assays of the core from the deep borings average 23 dwts. to the ton. The gold was struck not only at a vertical depth of 2400 feet, but at a distance of one mile from the outcrop."

It will require, however, large quantities of the conglomerates to be extracted from the deep workings and milled to prove the truth of the reports of their uniform richness. The word "reef" must not be taken in its ordlnary meaning. The reefs are not lodes or veins in any sense, but are true gravel or conglomerate beds. The term "banket" is often applied in Africa to any conglomerate bed, whether it contains gold or not.

THE Denver *Mining Industry* estimates that there are 60,000 men in Colorado who want work, and who are idle because they cannot get it. The population of Colorado is given by the last Federal census at 412,198 and the popular vote for President in 1892 was 93,891. It would appear from these figures, therefore, that two-thirds of the adult male population are without employment of any kind. It is hardly probable that the actual condition of things is so bad, though it is qnite bad enough.

The Mines of Nevada District.

TO THE EDITOR.—Although the depreciation of silver has had a disastrous effect upon some of the mlnlng disdricts of this coast, it has by no means seriously affected others. Some of the gold-producing districts have assumed a new and active life which could not have been derived from any other source short of new and fabulously rich strikes. Amongst the old districts whlch have received new impetus Grass Valley and Nevada City may be counted. The quartz-mining interests in Nevada districts, especially those within a radius of five miles from Nevada City, are attracting considerable attention at present.

Old and abandoned mines, a few years ago considered worthless, are turning out to he valuable properties, and, as a consequence, all of the old prospects and abandoned mlnes are belng lnvestigated and opened out anew. A great many of the silver men, who were compelled to shut down their mines on account of the decline in silver, are lookling for gold properties, and the gold men are now opening up all of those old propertles which they find will pay well to work by the improved methods of to-day ln order to meet the demand.

The Mountalneer, Providence and Champion mines are all working a full force of men, and their yield of bullion for this year is expected to be np in the figures that will attract the attention of the mlning world to the mines of Nevada City in the futnre.

Work is now under way on the Home mine, situated on Deer creek, a short dlstance below the Providence and Champion. This is an old property, worked in a primltive way years ago, and was finally shut down. In the intervening years, the old workings, situated in the creek bottom, had been totally obliterated by being covered to a depth of some twenty or thirty feet with the debris from the mines above. The present work ls being done on the hillslde, a short distance from the creek. Like many more of the old abandoned properties in Nevada county, worked with varied success in the palmy days gone by, many stories are told of the richness of the ore taken from this ledge. The Wyoming, whlch is situated across the creek from the Home, is shut down at present, the property being in litigation. This mine is also an old one and was worked years ago. Some very rich ore had been extracted.

One fact has been clearly demonstrated and that is, the veins in this district go down an unknown depth, and the most of them are true fissures. The mineral wealth of Nevada district ls unlimited, and all it requires to develop lt is the judicious use of capital by enterprising men who will open up those old properties and develop new ones to their own individual benefit as well as the benefit of the community. Such men, if they will investigate this district, will find many opportunlties for a safe lnvestment that will bring them handsome returns.

There is considerable prospectlng going on in this district this season and some new ledges that promise to become good paying propertles have heen uncovered. Through this and Grass Valley district, experience has taught the prospectors that whenever a ledge is rich in the croppings or near the surface it is invariably rich below the water level, although the pay may gradually diminish from the surface down to the water level in the mine. Could hydranlic mining be resumed to the extent it was carried on before the mines were shut down a few years ago, in the gravel mining sections above here, in a short time those old camps would be infused with new life, and the output of gold—the output of those hydraullc mines—would, to a great extent, decrease the general depression in business, and tend to establlsh good prices for the farmers' products in our local markets. It wonld at least greatly increase the demand for farm products in the counties and those adjoining where the mines are situated, and serve as a mirror to reflect back the farmers' folly in opposing the workling of those hydraulic mines. They have been the means of furnishing hlm a local cash market for his products in years past. I have met farmers on this trlp who say, "Let every hydraulic mine in the country run and give us back the cash market they afforded us ln the past, and glve us a chance to live and get out of debt instead of facing ruin and failure as we are to-day." Those men speak the truth, and realize the dlfference between prosperity and financial embarrassment, and if the radical farmers who "are cutting off their nose to spite their face," by so strongly opposing the resumption of hydraulic mining, could only see their folly as some of these foothlll farmers do, the difficulty would soon be adjusted and an era of prosperity would soon dawn on sunny California once more.

ALEX QUARTZ.

Nevada City, Cal., Aug. 28, 1893.

A New Metallurgy.

[Paper read before the San Francisco Academy of Sciences, Aug. 14, 1893, by Admiral Selwyn of the British Navy, describing his "Zymean Process of Ore Reduction."]

As the public are apt to suppose that a so-called "outsider" cannot know anything about a specialty such as metallurgy, it may not be out of place that the author should endeavor to show the course of events which led him to prosecute researches into the subject of humid processes for the extractlon of metals from their ores. Having been requested in 1871 by an English company, on the board of directors of which I had several personal friends, to proceed to the Territory of Utah, in the United States, in order to report on what was being done at some mines in which they were large shareholders, circumstances led to the stay I had originally intended to make being mnch prolonged. The mlnlng district in which the greater number of the company's mines were situated, known as Ophir Canyon, ls abont 30 miles westerly from Salt Lake City, and the mountain range of which Ophir Canyon is one of the most remarkable gorges, or valleys, had for a considerable time been known to contain rich veins and lodes of silver and silver-lead ores. Of the latter, the foot-wall is generally quartzite and the hanging-wall mountain limestone, full of fossils, the bedding being more or less an approach to the horizontal. The former are in the mountain limestone, and approach the vertical, their strike and dip varylng very widely.

Now seeing that the fossils were clear evidence that the limestone had once been liquid mud, or these shells could not have been included in their generally perfect state; seeing also that, whether the veins occurred at the contact of the two rocks or in the fissures of the limestone, the metalliferous ores had evidently been deposited in the veins or lodes subsequently to the solidification of the llmestone, it seemed to be a reasonable theory that nature had employed some solvent of the metals at the time of the formation of the mud, and from my recollection of Hugh Miller's proofs from the ganoid and ctenoid fishes, I believed that this solvent might well have been a hot salt-water ocean. I had no books to refer to, so I took the ores, powdered them and submitted them to the actlon of boiling brine. In no long time I found that abont half of the silver and lead contained by assay, had gone into a clear solution as chlorides. I had in fact followed unconsciously the experiments of Longmald in 1835 and Henderson in 1840 and had obtained the same results.

Bnt 50 per cent of the metal contained would but ill satisfy the mlner, and I began to consider that, given a hot salt-water menstruum, nature, or rather Providence, must have had an enormous amount of free chlorine to leave behind an ocean of chloride of sodium solution, after chloridizing all the other metals. If this were the case, then a little hydrochlorlc acid would marvelously improve the solvent powers of the brine employed. On testing this idea, with no more than ten drops of hydrochloric acid to a pint of saturated salt water, I found that practically, given sufficient tlme of boiling, the whole of the metals present went into solution, and in some instances, wlth silver, the fire assay was found to give less than that extracted by the humid method.

But still there were refractory ores which contained snlphur, antimony and arsenlc, and these, without a previous roasting, could not be successfully treated by any humid method then known, nor had any one up to the date of my dlscovery in January, 1887, ever snceeeded in conquering thls difficulty by any process which could be considered really feasible on the large scale at a mine remote from civilization and cheap chemicals. Even where chemicals were abundant at a low price, and the use of aqua regia or even cyanide of potassium could perhaps have been resorted to, the large quantities of such substances required to treat 100 or 200 tons of ore per day, their dangerous nature and many other considerations forbade entirely their practical use by rough miners at the mines, yet this is the chief condition of a paying result to the men who are primarily interested, *i. e.*, the capitalists who furnish the money and the miners who furnish the skill and the labor of mining enterprise.

On an average throughout the world, except in hydraulic mines or in the gold-washing districts, not more than one dollar is returned for each dollar spent in underground mining. Bnt if, instead of the low percentage of metals now extracted (the average for gold is not much over 50 per cent of that contained in the ore by assay), more nearly the whole could be obtained, then indeed the dollar expended might return two dollars instead of one—100 per cent instead of nothing—and even more if at the same time the expenses of extraction were materially reduced, and all the now wasted metals and metalloids were returned on the profit side of the balance sheet.

Thus it was an object well worth the attainment if only the difficulties could be overcome whlch had hitherto stood

in the way, especially with those ores denominated "rebellious" or "refractory," because containing sulphur, arsenic and antimony, besides base metals in large quantity, they required so long, so expensive and so complicated a treatment by igneous action as to transfer the greater part of the profits of the capitalists, or the miner, to the pockets of the carriers or the metallurgist.

To show how hardly the burden fell on the former, even where they were able to set up their own reducing works at or near the mines, it may be mentioned that out of a total expense in the United States for treatment of rebellious ores of $12, or say 48 shillings per ton, $8, or 32 shillings per ton went for roasting alone. At the same time the work of the mine as to "output" was bound down by the capacity of the furnace, rarely more than 50 tons per day being obtainable even from a Stetefeldt furnace costing $45,000. Even after the roasting, and the subsequent chloridizing with salt, either amalgamation with mercury or some other equally tedious process had to be resorted to before the bars of metal could be sent away from the mine; and even then the metals were impure and required another and more accurately conducted treatment before attaining a condition of such purity as would give all the value of each metal in the market.

In every way it was clear that if, after comminution, which can now be done by many different methods at a very small expense per ton, all the contained metal of any ore could be at once brought into solution in a short time and at as moderate expense as the crushing, without the use of any additional fuel, and each metal could then be precipitated pure in a separate vessel, very great progress would have been made in the science of metallurgy and highly economical results would follow. The first part of the problem was to get a method which would effectually bring all the metals into solution, and this had already been done by chlorination to a limited extent. A more perfect result might therefore be obtained by following up that method and chloridizing not only the ordinarily tractable metals, but also antimony, arsenic and the other metals known to chemists as forming chlorides. The extraction of the metalloids seemed also to be possible.

With what was already known of the powers of aqua regia or nitro-hydrochloric acid, and the more intense action of all acids in the nascent condition, it became obvious that a solution which should fulfill all the needed conditions would be one in which the chemical substances present could, on the introduction of the ores, so act and react on each other as to generate nitric, sulphuric and hydrochloric acids at the same time and with a superabundance of chlorine, since the last reaction must leave all the metals in the state of chlorides.

Therefore a saturated, or nearly saturated, solution of salt (say from 22 to 25 per cent of salt in water) would be the bulk of the solution desired. If to this were added sufficient nitrate of potash or soda (by preference the latter) to give whatever nitrogen is necessary to dissolve gold and other substances only soluble in nitro-hydrochloric acid, and which might be present in the ore, the elements would be combined, which, with pyritous ores, might react on each other to produce the three acids in the nascent state and dissolve all metals and metalloids that might be contained, leaving them in the state of chlorides. There was something, however, still wanting—the key, namely, that should unlock the combinations rapidly—and this was sought and found in the substance known as the dichloride of sulphur S_2Cl_2, and used principally for dissolving and cold vulcanizing caoutchouc. It is easily and inexpensively made from the sulphur of pyritous ores as obtained in the course of extracting the metals from their ores by this method, and from the chlorine gas which is also then generated, given off, and may be collected. S_2Cl_2 easily separates into its coostituents, if brought into contact with water, even at ordinary temperatures, and more rapidly as the temperature is raised, producing eveotually hydrochloric and sulphuric acids, and thus, so to speak, unlocking all the other reactions. But there are many and rich ores where no sulphur is contained, and with these, if this process is on other accounts preferred to amalgamation, it would be necessary to supply sulphur from some other source. This is generally easy in most mining districts, for the total absence of pyrites in some form, or of sulphides of some metals, is of the rarest occurrence, and even in those mining camps where at first nothing but free gold is to be found, no sooner is the water level reached than the sulphides make their appearance. Now it is not to be supposed that this method of extraction will supersede hydraulicing or amalgamatioo at once where the ores are free milling, though even that may eventually be found desirable, but wherever the gold is mainly float gold, in which case there had always been a great loss on the assay value, it is certain to come into use as soon as known, for it leaves no more than a trace in the tailings and occupies less than one hour in doing it. With copper, too, it offers almost incalculable advantages, for even from ores containing as much as 55 per cent the metal is obtained absolutely pure in about 4 to 5 hours instead of 21 days, which are occupied in smelting, and then it is impure metal that is produced, not telegraphic copper. Besides all this, it is well known that what are called now "rare metals" are constantly to be found in admixture with ordinary ores, but very rarely is any notice taken of them, in consequence, sometimes, of the minute quantities per ton of mineral, but more often on account of the difficulty hitherto attending their separation from the principal metals sought for by the miner and metallurgist. As by this system of metallurgy every one of the contained metals is brought into solution as a chloride by the same treatment at one and the same time, the only question is how best to precipitate each metal in a state of purity, no other being precipitated at the same time or in the same vessel.

Before going into this part of the question it seems desirable to give the formulæ, so far as they are at present known to me, which seem most nearly applicable to the reactions that take place in a boiling tank or vat. Richter says $H_2O+2Cl=2HCl+O$.

(I) Brande says S_2Cl_2 is composed of sulphur 30, chlorine 68.4. In presence of water, sulphuric and hydrochloric acids are formed, in consequence of the decomposition of the water.

(II) Watts' second supplement, page 321. Art., chlorine:

(1) The water is decomposed by the chlorine, $H_2O+2Cl=2HCl+O$.

(2) The chloride is decomposed by the water $2_2NaCl+H_2O=Na_2O+2HCl$.

(1) $S_2Cl_2+H_2O=H_2SO_4+HCl$.

(2) $NaCl+H_2SO_4=HCl+NaH_2SO_4$.*

(3) $NaNO_3+H_2SO_4=NaH_2SO_4+HNO_3$.

(* Query, $NaH_2SO_4+Cl=NaCl+H_2SO_4+O$.)

But as metals, when introduced into this solution, are rapidly attacked, even when in the state of sulphates or sulphides, and are converted into chlorides, *e. g.*, galena and copper pyrites, sulphate of soda, etc., a different formula from that which supposes the formation of sulphate of soda (see No. 2) must be found, and this agrees with Sir H. Davy's observation that salt is a chloride of the metal *sodium* and therefore we ought to get chloride of sodium in the last place and not sulphate of soda. This is precisely what does occur, in the presence of large quantities of nascent chlorine. Sulphuric acid is liberated, HCl acid gas is given off, and NaCl is formed anew. But neither chlorine nor sulphuretted hydrogen are found, because in presence of water they destroy each other. With rare exceptions, therefore, these gases are not observed, but as it is well known that chlorine will deoxodize all substances capable of being converted by it, at less than the temperature of boiling water, and as all metals and some metalloids come under these conditions, they are all equally affected and become chlorides, after a greater or less time of exposure to nascent chlorine gas, in contact with water. When, after filtration, reagents are used, which precipitate each metal in a state of metallic purity, the chlorine combined with them is at the same time liberated, and taking hydrogen from the water, becomes hydrochloric acid, according to the formula $H_2O+2Cl=2HCl+O$. But in dealing with ores on which concentratinn has been used, it is to be recollected that such mineral is no longer in the state of proportion in which it was deposited by natural causes, and the substance of greatest specific gravity will be largely in excess. Unfortunately these are base metals, such as copper, iron and lead, although the nobler metals are also raised in percentage by the same concentration to a certain extent. If dealing with float gold ores, of course it is sheer folly to attempt to concentrate by any humid action that does not dissolve it. But in ordinary concentrates, we shall find that on boiling, the copper, iron, sulphur and arsenic are the first things to go into solution, and that these are capable of influencing the specific gravity of the solution to such an extent as to completely saturate it, and render it incapable of acting on the nobler metals.

The same or a similar thing can occur when slimes containing much alkaline base are treated, for then it must have its share of the acid first, before any of the metals except the sodium, the copper and the iron will work, and this will have the effect of liberating large quantities of carbonic acid gas, which can be collected and stored under pressure—if for no other use than to make soda water (so called) for the miners. But it is, for some metals, an excellent precipitant. Remsen says, when sodium nitrate is treated with sulphuric acid, $NaNO_3+H_2SO_4=NaH_2SO_4+HNO_3$.

Brande says, p. 594-5, article, chlorine: All the metals appear susceptible of combining with chlorine and of producing a class of compounds which may be termed metallic chlorides. There are a few of the metals which resist at common temperatures, but when heated combine with it, some slowly, others rapidly, and with intense ignition.

The attraction of chlorine for metals is greater than that of oxygen, consequently when a metallic oxide is heated in chlorine, oxygen is evolved, and a chloride is formed. The insoluble chlorides are also formed by adding solution of chlorine or of the soluble chlorides, or of hydrochloric acid to the soluble metallic salts.

Turner, page 408-9: Two only of the metallic chlorides are decomposed by heat, gold and platinum. All the chlorides, excepting those of silver and mercury, are readily decomposed by hydrated sulphuric acid, with disengagement of HCl acid gas. The change is accompanied with decomposition of water, the hydrogen of which combines with chlorine, and its oxygen with the metal. All chlorides, when in solution, may be recognized by yielding with nitrate of silver a white precipitate, which is chloride of silver.

Richter, in his Inorganic Chemistry, says on Halogens, page 49: The great affinity for hydrogeo of *chlorine* (translation by Edgar Smith, *als eidos* having the form of sea salt) is manifested in the hydrogen compounds. Most of these are so decomposed by the chlorine that it removes the hydrogen from them and forms hydrochloric acid.

Thus water is decomposed by chlorine into hydrochloric acid and oxygen according to the formula $H_2O+Cl_2=2HCl+O$.

To start with, this statement, on excellent German authority, is certainly perfectly intelligible to all chemists, and even to many others who, like myself, lay no claim to general chemical skill, and if the fact is borne in mind that dichloride of sulphur instantly separates itself, on contact with water, into chlorine and sulphur, and, as shown above, the chlorine so produced decomposes the water, and leaves free oxygen, we shall be able to see what the sulphur does, so soon as it acquires its liberty.

$S_2Cl_2+H_2O=H_2SO_4+HCl$.

That is, as soon as the chlorine has taken the hydrogen of the water into partnership, the abandoned oxygen allies itself with the free sulphur and becomes a strong acid in the nascent state, called sulphuric acid. At the same time the alliance of the chlorine with the hydrogen has given rise to another acid in the nascent state, called hydrochloric or chlorhydric acid. If nitrate of soda $NaNO_3$ is also present it would at first sight be supposed that sulphate of soda and nitrous oxide would be produced in the presence of nascent sulphuric acid, and no doubt this reaction does take place, just as much as with the chloride of sodium. But again the nascent chlorine asserts its supremacy over all metals, and the sulphate of soda has to become without any delay NaCl, chloride of sodium, common salt, again, the nitrous oxide becoming nitric acid. When in such a solution as we have been now considering, metallic compounds are present, the chlorine at once separates every one of them from its previous combination and reduces or transforms each into the state of a soluble metallic chloride—soluble in a hot salt water menstruum and capable of being separated from the combination with chlorine by a great variety of precipitants, foremost among which is an electrical current of low intensity but enormous quantity, if only sufficient time be available without inconvenient results. Such and no other do I believe to have been and still to be nature's precipitant for the metals, but the life of man is too short for him to adopt it, if more rapid action can otherwise be secured. Therefore the young metallurgist is taught to use what are called "group" precipitants, and from practice on the large scale he soon learns the use of certain "special" precipitants which deal more satisfactorily with the particular metals he wishes to obtain from his solution. The art is, however, far from being perfect, and often calls for the sacrifice of a common metal in order to obtain that which is more precious. Thus we still sacrifice a large percentage of iron to obtain pure metallic copper, and it answers well enough where scrap iron is a drug on the market. But not at a copper mine, remote from transport, can such a method be a really practical success, and better means can be found, and will no doubt be soon adopted, which will give us the copper (as is done when precipitating with iron) in a chemically pure and metallic state, ready to be cast into bars. When this can be done with every metal, we shall have reached that stage of progress which I have here shown is now available, as far as bringing metals into solution is concerned.

But even at the present time, gold can be and is precipi-

NOTE.—The equations (or formulæ) shown at the Academy were as follows:

(1) $H_2O+2Cl=2HCl+O$.—Authority, Richter and others.

(2) $S_2Cl_2+H_2O=H_2SO_4+HCl$.—Brande, &c., &c.

(3) $NaCl+H_2SO_4=HCl+NaH_2SO_4$.—Turner, &c., &c.

(4) $NaH_2SO_4+Cl=NaCl+H_2SO_4$?—(Suggestion.)

(5) $NaNO_3+H_2SO_4=NaH_2SO_4+HNO_3$.—Watts, &c., &c., Remsen.

(6) $NaH_2SO_4+Cl=NaCl+H_2SO_4$?—(Suggestion.)

These suggested equations are given because, as a fact, no sulphate of soda, but pure chloride of sodium, is found at the end of the operation.

tated by sulphate of iron; silver by sulphide of sodium or calcium; copper by iron; lead by washing soda, etc. To a skilled metallurgist there is no great difficulty, but only objectionable delay, in completely precipitating any metals likely to occur, when once they have been brought into solution as chlorides, and precipitating them in a separate and pure state, as far as admixture of any two metals is concerned, though often recovered as sulphides, which are cumbrous and bulky, and therefore, if possible, to be avoided.

But I do not, at present, wish to bring forward new means by which I believe more rapid and complete precipitation can be obtained, of each metal by itself. If I am able to convince the audience that all the metals can be brought into solution from any ore, however refractory, at the mine, cheaply and speedily—that is, I submit, a long step towards giving the miner a very much greater share of profit than he has hitherto been able to obtain, and may even enable him to continue producing silver at a profit although the market price should fall to 50 cents an ounce.

Review of Admiral Selwyn's Lecture.

The subject of the admiral's lecture is one which always interests our mining men, and, while it is an ungracious task to point out the errors and fallacies of a gentleman who seems to be quite honest in his endeavor to improve the practice of metallurgy, yet the exalted station of the lecturer, the circumstance that the lecture was delivered in the hall and under the auspices of the Academy of Sciences, and the fact that it has excited considerable interest among many who do not assume to be competent judges of the subject, make it our duty to notice what we should gladly have passed over in silence. There are heights of absurdity and abysses of error which one can but contemplate with astonishment and a sense of utter hopelessness, and this is a case in point.

When the admiral meddles with chemistree,
He's just where an admiral ought to be—
All at sea.

It would be superfluous to point out to chemists or metallurgists the fallacies, the false equations and the impossible combinations which are offered us, and to explain them to those who are not chemists would be an equally thankless task. The chemist needs no prompting to see the absurdity of the formula NaH_2SO_4, representing a compound which is neither known nor suspected to exist, though apparently intended to represent hydrogen sodium sulphate, nor to perceive the falsity of the ostensible equation $S_2Cl_2+H_2O=H_2SO_4+HCl$. Neither is it necessary to call the attention of the scientist to the gratuitous and unwarranted assumption that all of the metals ever existed in the form of chlorides. But we understand the admiral does not attach much importance to these matters, but pins his faith to what he alleges to be practical facts, and as our non-chemical readers probably take a similar view, we will confine ourselves chiefly to that aspect of the case.

First we must notice what seems to be a misunderstanding as to the chief reagent used in the process. The admiral *calls* it dichloride of sulphur, and *writes* it S_2Cl_2, which is the formula of the monochloride. He says it is the substance formed by passing chlorine over melted sulphur, and is used to dissolve and cold vulcanize caoutchouc, which indicates the monochloride again; and yet he gives the percentage composition of the dichloride.

The fact seems to be that the substance is really the monochloride, which was perhaps called dichloride by the old chemists, just as cuprous chloride used to be called dichloride of copper. The formula SCl in the old notation is SCl_2 in the new, having, in each case, the percentage composition given in the lecture, allowing for the rectification of the atomic weight of chlorine. The S_2Cl_2 of the present system corresponds to S_2Cl in the old system and contains 52.56 per cent of chlorine.

It is not merely a question of name; the reactions of the two substances differ in important particulars. As the admiral uses the symbol H_2O in his other formulas, we conclude that he intends his S_2Cl_2 in accordance with the new system, but has mistaken the name through reading old authors; this assumption accords best with his general statement.

The lecturer makes the following assertions :

(1.) That the sulphur compound S_2Cl_2 forms sulphuric and hydrochloric acid on contact with water.

Mixter says :

$2S_2Cl_2+2H_2O=4HCl+SO_2+3S$, and with another molecule of water we have $SO_2+H_2O=H_2SO_3$.

This means that we get hydrochloric acid, sulphurous acid and sulphur, not sulphuric acid, as stated by the lecturer. It is true that sulphurous acid, H_2SO_3, in cold solution, does slowly absorb oxygen from the air, forming sulphuric acid, H_2SO_4, but in a hot solution even this cannot occur; the sulphurous acid rapidly evaporates unchanged. If we should use the true sulphur dichloride, SCl_2, we might have some sulphuric acid formed, because that substance gives off chlorine, leaving sulphur monochloride, S_2Cl_2, which then decomposes as above, and sulphurous acid *with chlorine* forms sulphuric and hydrochloric acids. But, in fact, as repeatedly stated by the admiral, sulphate of soda is not formed, although salt is present, and that *proves* that sulphuric acid is not produced, which again proves that chlorine is not evolved, and hence the sulphur compound is not the dichloride SCl_2.

(2.) That sulphuric acid produces chlorine from salt water.

This is an error, as every chemical tyro knows. It produces hydrochloric acid and sodium sulphate, or disulphate. (The above assertion has been made and insisted on in conversation if not in the lecture.)

(3.) That salt water converts all metal sulphates to chlorides.

This is not true. Salt water converts to chlorides those sulphates of which the bases have less affinity for the sulphuric acid radical than the sodium of the salt has, and then sodium sulphate is formed. Potassium sulphate is not changed to chloride by salt water. Copper, iron and lead sulphates are so changed.

(4.) That sulphuric acid does not produce sulphate of soda from salt water in this process, or that any sulphate of soda formed is changed to chloride by chlorine.

Error. In the first place, chlorine is not produced in the process; in the second place, chlorine cannot change sodium sulphate.

(5.) That the sulphur chloride acts like a ferment, starting a reproductive action which continues as long as any ore remains.

This is arrant nonsense. If it were true, an ounce of the stuff would suffice for an unlimited quantity of ore; a little fermenting pulp from a vat in operation would suffice to start fermentation in another charged vat, and there would be no necessity for constantly preparing the ferment anew.

(6.) That the acids are more active in the "nascent" state than otherwise.

This is more than doubtful. No chemist, we believe, talks of nascent hydrochloric acid. The theory of the *statu nascendi* is applicable only to elementary atoms and compound radicals which act as such; neither hydrochloric nor sulphuric acid is either of these. So far from being in *statu nascendi* at the moment of formation, they are more like newly-married couples, to be parted only by high temperature, or by the offer of greater inducements to the components to form new alliances, in which case a divorce must precede or be simultaneous with the readjustment.

What then does this process amount to? To treating the ore with hot hydrochloric acid, unless nitre is added, in which case we shall have a portion of aqua regia, and *then* we must form sulphuric acid which, however, at once acts on the salt water with production of hydrochloric acid and sulphate of soda. There may be an advantage over the simpler process of adding hydrochloric acid to the brine, in this way: The sulphur chloride sinks to the bottom of the vessel; the ore also sinks. The acid produced then attacks the ore, while not diluted so much as it would be if simply added to the brine.

It may be, also, that a part of the sulphur chloride is decomposed, not by the water, but by the minerals in contact with it, the chlorine thus not forming hydrochloric acid, but uniting directly with the metals. This is indicated by the statement that the gold in an ore is acted on, even in the absence of nitre, but not rendered completely soluble, as it would be if aqua regia were present, or free chlorine were evolved "in large quantity."

The lecturer says that our metallurgical processes are too complicated for the use of "rough miners." What does he offer us in exchange? The rough miner must provide a little sulphur to begin with, salt, a dynamo and an engine to drive it, apparatus for making the sulphur compound from sulphur recovered, and chlorine developed by electrolysis from salt water; a number of vats for dissolving, filtering, and precipitating the different metals separately, either in metallic state or as compounds; precipitants, or material and apparatus for making them; apparatus for filtering, washing, drying and reducing the various metal compounds obtained, and for melting the metals; and a large and varied assortment of chemical and mechanical knowledge and skill to enable him to execute the multitude of operations required, not forgetting the final purification and restoration of his salt bath, which is not to be thrown away, but used over again *ad infinitum*.

And in the wild and woolly West, to which this beautifully simple (?) process is so eminently adapted, many of the substances which must be separated, if the bath is not to be thrown away, would not be worth the freight to a market.

That this process will extract the metals from many ores, if enough of the medicine be used, may be admitted, and more so if nitre is added. That it is cheap, simple, or desirable in any way, we cannot concede. And our readers may be sure that the sulphur compound must be used in even more than the quantity which may be chemically equivalent to the compounds to be decomposed by it, including the carbonate of lime which is so common a constituent of silver and copper ores. The proposal to utilize the carbon dioxide evolved in making "soda water," for the refreshment of the weary workman, must be a joke, or it is too silly for comment.

If we have an ore with five per cent of galena, and nothing else, such as lime, to consume hydrochloric acid, we shall require 177 pounds of S_2Cl_2 per ton to produce the hydrochloric acid strictly necessary to convert the lead into chloride; but much of the acid will be lost, so we may say about 200 pounds to a ton of such ore. It would require about 94 pounds of sulphur to reproduce the reagent; a part or all of this sulphur would be recovered from the operation. If nitre were also freely used, it would economize the sulphur chloride.

We advise our non-chemical patrons to leave this process alone, and not be mislead by the ancient and worn-out pretense that professional metallurgists in general will not receive a really valuable new process with open arms. It is now many years that this process has been in evidence, more or less, and it is in use nowhere.

EDITOR MINING AND SCIENTIFIC PRESS.

Diminished Wheat Supply.

Whatever the effect upon the market, says the London *Farmer*, it is certain that the supply of marketable wheat will be materially less this year than it was in 1892. This applies to the total contributions—home and foreign—to British as well as other markets. We notice that *Beerbohm* ventures upon a quantitative comparison of the production of wheat this year and last in the United Kingdom, France, Germany, Hungary, Roumania, Bulgaria, Spain, Italy, the United States, and India, making the total for 1893 something under 187,000,000 qrs., or 19,000,000 qrs. below the return of 1892.

It will be noticed that several important wheat-growing countries are omitted from this estimate, notably Russia, the Argentine Republic, and Canada. The Russian crop is as yet too uncertain to permit of a fair estimate. In the Argentine Republic a substantial increase is expected, but this again will probably be fully counterbalanced by the anticipated falling-off in the Canadian crop. It has to be noted, however, that the stock of old wheat in the United States is about 6,000,000 qrs. in excess of that held last year, which makes up for about a third of the deficit in this year's crop. Russia may alter this estimate to some extent, of course, but the chances of the deficiency being fully made up are very remote.

If this seven per cent estimated reduction in the wheat produce of the year has any effect in raising the price of wheat to something like the figure of former times, it will be a welcome state of things to the British wheat-grower.

The United States' crop is now believed to be even less in bulk than was expected a month ago. The latest report issued from the United States Department of Agriculture returns the winter and spring crops taken together at only 76.7 per cent of a full crop, as compared with 78.8 for June and with 90 for July last year. As the area of the crop is several millions of acres less than it was last year, it may now be regarded as almost certain that the total produce will be under 400,000,000 bushels. Last year the crop was returned at 516,000,000 bushels, and in 1891 at 612,000,000 bushels. To say the least, then, America will this year harvest 116,000,000 bushels less than the produce of 1892, and 212,000,000 bushels less than that of 1891. The home requirements for the cereal year are at least 370,000,000 bushels, so that America will have a surplus of less than four million quarters from the crop now being harvested. Allowing for the great stores of old wheat, the total surplus for export can hardly exceed thirteen million quarters, against more than twenty-three millions for the cereal year just ended in the United States, and over twenty-eight millions in 1891–92. Such a great reduction in the supply of wheat must tell sooner or later, even if the combined surplus of Russia, India and the Argentine Republic will make up for the deficiency in nearly all European countries except Russia.

India, on the other hand, has a good crop. In that country there are 26,238,000 acres under wheat this year, compared with 24,482,000 last year, which give an estimated product of 7,149,000 tons, or 32,548,300 qrs. of wheat, as against 5,535,000 tons, or 25,200,300 qrs. in 1892. These figures show India to have some 7,348,000 qrs. more to dispose of this season than last. If all this increased surplus should come into the market during the approaching season it would in some measure atone for the American falling-off. But as the condition of other crops largely influences the volume of Indian trade, the estimates really afford little criterion of what the extent of the shipment from that country may be. It may, however, be rightly contended that if prices remain at their present low standard during the coming season it will be from some other cause than an excessive supply.

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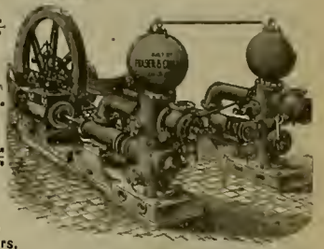

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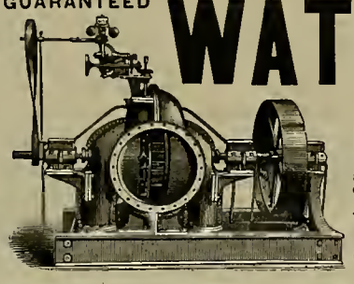

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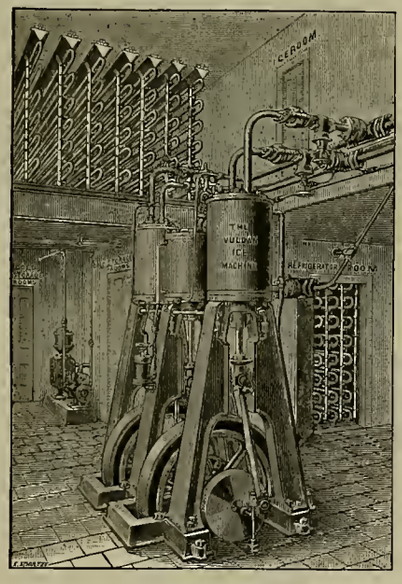

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Harmonic Vibrations.

Impolses which, occurring singly or at irregular intervals, are incapable of producing any noticeable effects, may, when made regularly, under favorable circumstances, yield astonishing results, says George M. Hopkins. The rattling of church windows by air waves generated by a particular pipe of the organ, a bridge strained or broken by the regular tramp of soldiers or by the trotting of horses, the vibration of a six or eight-story building by a wagon rumbling over the pavement, a factory vibrated to a dangerous degree by machinery contained within its walls, a mill shaken from foundation to roof by air waves generated by water falling over a dam, are all familiar examples of the power of regular or harmonic vibrations.

Harmonic vibrations result from regularly recurring impulses, which may be very slight indeed, but when the effects of the impulses are added one to another, the accumulation of power is sometimes very great.

To secure cumulative effects the impulses must not only be regular in their occurrence, but the body receiving the impulses must be able to respond, its vibratory period must correspond with the period of the impulses, and, further than this, the impulses must bear a certain relation to a particular phase of the vibration, in order that they may act upon the vibrating body in such a way as to augment its motion rather than diminish it.

There are railroad bridges that vibrate alarmingly when crossed by locomotives running at a certain speed, the vibrations being caused by the comparatively slight lack of balance in the driving-wheels and connecting rods. For this reason the speed is restricted on such bridges.

During the early tests of the East River bridge, between New York and Brooklyn, it was found that the structure was so massive and its vibratory period so slow that it could not be injuriously affected by the marching of men or the trotting of horses; consequently, travel proceeds on this bridge as upon any highway.

A well-known English physicist is reported to have said that with suitable appliances he could break an iron girder by pelting it with pith balls. An experiment of this kind would certainly show in a striking manner the effects of very slight rhythmic impulses. As it is manifestly impracticable to perform such an experiment, an easier method of illustrating harmonic vibration must be sought.

The Alloys of Lead.

Few metals form so many alloys as lead. It alloys with potassium, sodium, arsenic, antimony, tellurium, bismuth, tin, cadmium, manganese, mercury, silver, gold, platinum, paladium and iridium; not with aluminium, iron, cobalt, nickel, zinc or copper, says the New York *Tribune*. Alloys of arsenic with lead occur in leaden shot. Alloys with antimony are of great importance; type-metal is one. It is harder, more tenacious and more fusible than either of its components, and expands on solidifying, thus giving a sharp impression in the mold. Common type-metal contains about 15 per cent of antimony. An adulteration of six per cent of tin is said to promote durability. Many alloys are specified for various uses, stereotype plates, music plates, etc. It would seem that there is here a field for experiment and invention, inclusive of the introduction of aluminium and nickel, etc., and their alloys. Stereotype metal containing bismuth, which expands much in solidifying, has been tried; but bismuth costs now about $2 per pound. Alloys with tin include pewter, soft and hard solders, and fusible alloys. The latter are usually triple alloys of lead, tin and bismuth. "Rose's alloy" contains one part of lead, two of bismuth, and one of tin. It melts at 201 degrees Fahr. An American chemist named Wood, by substituting cadmium (a little less costly) for bismuth, got an alloy melting at 160 degrees. The addition of mercury to any of these reduces the fusing point still more. Solid metallic casts have been taken of living human faces, etc., by this means, which can then be multiplied indefinitely by electrotyping or otherwise. The uses of fusible alloys have been far from receiving from inventors the attention that they merit. Were there a large demand for bismuth it could be made a very much cheaper metal.

Aluminium in the Household.

The appearance of aluminium cooking utensils in the windows of hardware and grocery stores of San Francisco suggests the fact that the metal is becoming both common and cheap. We may expect that it will eventually become as useful in the household as tin or granite ware, and probably it will be found that it is quite as durable. Aluminium, though light, is nearly five times heavier than the lightest metal of somewhat similar kind, namely lithium, but all the other metals of the earths and alkalies are marked by their too great combustibility, of which property the photographer avails himself in magnesium, whence he obtains his flash light. Aluminium alone seems to be useful for mechanical purposes, and, it is said, does not combine with mercury, but there does not seem to be a field for it either in quality or price as the substitute for iron. Aluminium has been probably vastly overrated as a material for heavy structures, as bridges, etc., but this is no fault of the metal.

In this connection it is interesting to note a press dispatch from Duluth, Minn., August 23d, declaring that a local chemist has found a process for obtaining aluminium from its own oxide. The discoverer of this process and his Duluth associates say that they can produce pure aluminium at a price considerably below that of any of the electrical processes, and cheaper, bulk for bulk, than copper. Experiments have been under way where the clay is rich in aluminium, for much over a year, looking to the perfection of the process.

Soldering Glass and Porcelain.

The soldering of glass and porcelain with metals is a novel French process, and its adaptations are likely to be as numerous as they are valuable. It is also simple. The portion of the tube that is to be soldered is, according to an exchange, first covered with a thin layer of platinum, this deposit being obtained by covering the slightly-heated glass by means of a brush with very neutral chloride of platinum mixed with essential oil of chamomile, the latter being slowly evaporated, and when the white and odoriferous vapors cease to be given off, the temperature is raised to a red heat, the platinum is then reduced and covers the glass tube with a layer of bright metal. On connecting the tube thus metallized and placed in a bath of sulphate of copper to the negative pole of a battery of suitable energy, there is deposited on the platinum a ring of copper which will be malleable and very adhesive if the operation has been properly performed. In this state the glass tube covered with copper can be treated like a genuine metallic tube, and be soldered to iron, copper, bronze, platinum or any metals that can he united with the solder.

An Electrolytic Copper Refinery.

An immense electrolytic copper refinery has been started at Great Falls, Mont., by a Boston company. It comprises 288 depositing vats capable of containing at one time 1,600,000 pounds of pig copper anodes, and has a capacity of 1,200,000 pounds of pure electrolytic copper per month. The plant is run by water power, situated at a distance of 1200 feet from the works. The current is supplied by two dynamos, of 165 kilowatts capacity each. The total cost of the plant, exclusive of real estate, is said to have been over $350,000. The metal refined contains a large percentage of silver, all of which will be saved by the electrolytic process.

Metallurgy of Lead.

At the recent annual meeting of the Royal Society, held in London, a memoir on the metallurgy of lead was presented by Mr. J. B. Hannay. He described several new volatile compounds of lead, the discovery of which gave the key to the solution of many of the difficulties which had hitherto beset the path of the investigator, and by examining all the furnace reactions of lead compounds in the light of those discoveries he was enabled, he said, for the first time, to present a true explanation of the metallurgy of lead, founded upon accurate knowledge. The process consisted in passing a stream of air through the lead ore in a Bessemer converter, by which simple means the whole of the ore was converted into pig lead, or litharge, or sulphate of lead, as might be required, thus enabling the manufacturers to make the product bringing the best price in the market. The oxidation of the ore supplied all the heat required to conduct the process, so that no fuel was required. The importance of this new process, Mr. Hannay declares, might be judged from the fact that not only was the whole of the lead obtained as finished products without loss, as against 20 per cent loss by the old method, but every ounce of silver was separated and collected without any expense, no matter how little silver might be present.

Stone Under the Microscope.

It is often held that the best method of determining the probable durability of a building stone is to study its surface, or thin, transparent slices, under a microscope. This method of study in recent years has been most fruitful in developing interesting and valuable knowledge of a scientific and truly practical character.

An examination of a section by means of the microscope will show not merely the various substances which compose it, but also the method according to which they are arranged, and by which they are attached to one another. For example, pyrites is considered to be the enemy of the quarryman and constructor, since it decomposes with ease and stains and discolors the rock.

Pyrites in sharp, well-defined crystals sometimes decomposes with great difficulty. If a crystal or grain of pyrites is embedded in soft, porous, light-colored sandstones, its presence will certainly soon demonstrate itself by the black spot which will form about it in the porous stone, and will permanently disfigure and mar its beauty. If the same grain of pyrites is situated in or near very hard, compact, non absorbent stone, the constituent minerals of which are not rifted or cracked, this grain of pyrites may decompose and the products be washed away, leaving the stone untarnished.—Stone.

Bed of the Atlantic Ocean.

It seems that the hollow of the Atlantic is not strictly a basin whose depth increases regularly toward the center, the latest investigations showing that it is rather a saucer or dish-like one, so even is the contour of its bed. It is found that, proceeding westward from the Irish coast, the ocean bed deepens very gradually—in fact, for the first 230 miles the gradient is but six feet to the mile, though in the next 20 miles the fall is more than 9000 feet, so precipitous being this sudden descent that, in many places, depths of 1200 to 1600 fathoms are encountered in very close proximity to the 100-fathom line. With the depth of 1800 to 2000 fathoms, the sea bed in this part of the Atlantic becomes a slightly-undulating plain, whose gradients are so light as to show but little alteration of depth for some 1200 miles, the extraordinary flatness of these submarine prairies, therefore, rendering the familiar idea of a basin rather inappropriate. The greatest depth in the Atlantic is claimed to have been found some 100 miles to the northward of the island of St. Thomas, where soundings of 3875 fathoms were obtained. The seas around Great Britain, instead of forming part of the Atlantic hollow, as heretofore generally regarded, are now alleged to be rather a part of the platform banks of the great European continent which the ocean has overflowed.

Mechanical Progress.

Trying to Raise a Wrecked Steamship.

The abandonment of the attempt to raise the wrecked collier, San Pedro, in Victoria harbor, ends one of the most expensive and pretentious works of that kind in the marine history of the Pacific coast. It is estimated that the Southern Pacific company has expended no less than $250,000 in the effort. The ship has been lying on Brotchie Ledge for upward of 18 months, and the steel plates amidships have been punctured every two feet between the heavy ribs; besides the injury is so located that it is impossible to get at it. So long as the vessel remains on the rock the water cannot enter, but the moment she is lifted the sea rushes in with terrible force.

Since January of this year the work has been in charge of Capt. J. M. Lachlan, of New York. On March 16th Capt. Lachlan began active operations. By this time the upper deck had fallen in, and the vessel was so much injured that he was compelled to adopt the inclosed coffer dam which was afterward built.

After long work and several failures, arrangements were made for the final attempt. Capt. Lachlan says:

"I determined to make sure of the pumps and had four more placed in position on the wreck, so that last week, when we made our last test, there were all the pumps necessary. I had in all 23, with capacities ranging from 750 to 5000 gallons per minute. These were kept going steadily and incessantly for 14 hours and 20 minutes, and all that time were discharging over 130 tons of water per minute, so that the total discharge for the period mentioned was over 111,800 tons.

"At full high tide, when the water would flow no longer, and after all those hours of pumping, I had the tug Tacoma, one of the most powerful on the sound, try and pull her off. We used a hawser, a brand new one, 19 inches in circumference, but when this was straightened out there was not a budge. Then the Tacoma went back a little and ran ahead, giving the bawser a great jerk, but still there was no move. Once more this was tried, the Tacoma going back still farther, then full steam ahead with such force as to snap that big rope like a piece of twine, but the San Pedro did not even tremble.

"The attempts made during the last fortnight are the only occasions on which the San Pedro has ever been raised from the ledge. She has a double bottom, the false bottom, or the outer one, being four feet below the inner one. Now, let me tell you what the result of my work was. The forward end of the vessel, from the stem to the foremast, or the first bulkhead abaft the collision, was perfectly tight, with absolutely no water in it.

"In No. 2, abaft, I could control the water down as far as the orlop or lower deck, which was covered over, a false deck having been put in. In the boiler room I could do nothing except plug the leaks on the inner bottom, which is four feet from the real bottom of the ship. The outer bottom was pierced through and through, and it was only where the rocks came through the inner bottom that I could plug. From the pilot house on the side I constructed a house batter shutting the water out, and inside of that a wooden bulkhead.

"From there to the ship's stern, a distance of 40 feet, I built an inclosed coffer dam. Now, the two ends of the ship would be sufficient to float the ship and carry the middle part with the water, but the vessel was lying for 65 feet on the port bilge so

so close to the rock that you could not get your hand in between on either side. The great desideratum was to get her to come upright so that the men could slide in the collision shutter I invented for the purpose, and the four large collision mats kindly loaned by Rear Admiral Stephenson.

"After all this pumping we raised her eight degrees, but when the water came rushing in through these 65 feet of holes, and as we could not pump the Royal Roads dry, she went back to her old position. I had no idea the ship was damaged to the extent she was. Knowing now the injuries that have been done, I am satisfied that it is impossible to raise the vessel. The area of the holes I had filled up was 51,840 gallons per minute, but the snip is hung on the rocks which have pierced her between the ribs, and the girders from the hatches to the bottom are caught so that she cannot be moved."

The Steam Pumping Plant of the Future.

F. W. Dean, member of the American Society of Mechanical Engineers, recently prepared an exhaustive article on recent practice in pumping engines. Mr. Dean's investigations have led him to the conclusion that the most economical steam plant of the future will be designed as follows:

The boiler will be of the locomotive type, having a ratio of heating to grate surface of 75 or 80 to 1, working with over 200 lbs. of steam, having artificial draft and burning 30 or 40 lbs. of coal per square foot of grate per hour. This type of boiler is selected because it is the most economical of all boilers, either when forced or not, will stand the highest pressures, extreme forcing and general abuse without harm for many years. It is the pioneer of high pressures throughout the world, and its success under the most trying conditions shows it to be perfectly safe.

The engine used will be a moderately fast running vertical quadruple expansion furnished with steam superheated by the waste gases of the boiler. The cylinders will be steam jacketed, and the initial steam in the high-pressure cylinder may be wire-drawn considerably below the boiler pressure. There will be reheaters between the cylinders, the condensation from the working steam side of which will be passed through evaporators in the smoke flue of the boiler and returned to the most advantageous point of the engine.

The live steam should not evaporate any of this condensation, on account of the great amount of heat required, but should merely prevent condensation. The condensation from the live steam side of the reheater should be returned to the boiler. There will be a feed-water heater in the low-pressure exhaust pipe, and this water will have added to it the rejected heat of the auxiliary engines, if there are any, and will then pass through an economizer in the flue beyond the superheater and evaporator on its way to the boiler. The jacket condensation will pass to the boiler independently. The smoke-box end of the boilers will be near the engine in order to diminish the dissipation of the superheat of the steam which occurs very readily.

In the case of pumping engines the pumps will have a large valve area with many small automatic valves, or with few large automatic lifting and mechanical closing valves.

Large Guns for the Navy.

The experience of Great Britain and Italy has not tended to predispose our authorities in favor of exceptionally heavy ordnance. The 110-ton guns have been removed from Italian ships. The war vessels Indiana, Massachusetts and Oregon are each to be supplied with four 13-inch pieces. They are nearly 40 feet in length. The diameter at the breech is somewhat over 4 feet and at the muzzle 21 inches. The guns throw a projectile of 1100 pounds, with 550 pounds of powder as a charge.

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Electricity.

Rapid Transit and The Advent.

Rev. A. J. Wheeler, pastor of the Advent Christian Church, of Boston, recently preached a sermon on "Rapid Transit." The pastor's idea appeared to be centered chiefly upon the fact that electricity and rapid transit are closely connected, taking from this a significance of the fulfillment of Old Testament prophecy. He read from Daniel, where it is said: "Many shall run to and fro, and knowledge shall increase," and upon similar prophecies he based his remarks.

"Rapid transit," said he, "is the fulfillment of God's prophecies. It was what he spoke of to those prophets thousands of years ago.

"Rapid transit is not simply for the development of commercial interests. I believe there is a divine economy interested with it.

"God has made these electric cars, these electric wires, His agency to fulfill the promise of that great day of days, when the trumpets shall sound and when the dead in Christ and those on the earth shall rise to meet Him.

"God has arranged everything for this day through this agency; the rails are laid, the wires are stretched. The lightning of the heavens shall meet with the lightnings of earth. He has made the earth ready for that day of the second coming, that we shall be ushered into the new kingdom. The wires, the cables are all slaves to Him, and when He bids them move they will bow to Him."

Cutting Fabrics by Electricity.

A new instrument has been devised that will cut fabrics of every description, of many thicknesses, with remarkable rapidity. The finest of linen is severed with the same ease as the firmest and coarsest goods, and a thickness of three inches and a half offers no obstacle to the progress of the cutting blade. The machine weighs about 35 pounds, and is 17 inches high and 8 inches in diameter. The cutter revolves at a speed of 2500 revolutions per minute, and is kept sharpened by a little attachment carrying a small emery wheel, which can be applied to the rapidly revolving knife at such an angle as to ensure a perfect cutting edge. The machine can be operated on any incandescent circuit, and is so simple that it cannot get out of order. Its operation entails no special training, and any novice can use it after an hour's instruction. It is no slight advantage to be able to operate an effective cloth cutter for less than three cents per working hour, which is said to be the actual rate of this machine. It is claimed that the machine will do the work of eight men, and, furtbermore, that in one house in New York, one machine alone is cutting 1000 dozen pairs of trousers per week of five and one-half working days. A lamp is attached to the machine, so that it can be used in dark lofts and on dark days. An instrument which is used to advantage in conjunction with this machine is the electrical sad-iron, the heating current for which can be instantly turned on or off.

For Protection of Passengers.

The New York State Board of Railroad Commissioners has sent a circular to every street service railroad in the State, recommending that every car operated by the electric trolley system in the State on a double track line be equipped with gates on both ends, and that only one gate—that opposite the other track on the rear platform—be open for the ingress and egress of passengers; also that no person, except an instructor when necessary, be allowed to ride on the platform with the motorman on any electric car. The board also recommends that on all open cars operated by the electrical trolley system on double tracked lines there shall be attached a guard on the side of the car next to the opposite track, running the entire length of the car, to prevent passengers entering or leaving the car on that side; this guard to be of such a nature that it may be transferred from one side to the other.

Forging Round Shapes.

The claim, according to an exchange, has been made by a Boston company of producing the first successful machine for electrically forging round shapes. The machine, which is designed and built for rapid and accurate work, is rotary in all its movements, and thus no time or power is lost in the return of the dies to their working position. Articles from one-half inch up to six inches long and from one-half to an inch in diameter can be turned out, meeting, in its capability, the production of the great variety of things now made of iron or steel, of low carbon, in order that they may be turned out economically. By this machine, however, it appears that highly carbonized steel may be worked equally as well as iron or soft steel, and it is within its range to roll successfully steel of the highest grade of crucible down to the open hearth and Bessemer; copper and brass are also satisfactorily worked. By this rolling process it is said that 100 perfect handles are capable of being made in the time required to make one by former methods. Anti-friction steel balls, from one-eighth to two inches in diameter, are likewise manufactured by this forging process at a speed otherwise unapproached. A red-hot steel bar is inserted between the revolving dies, and for every revolution of the dies a ball is forged, or a conical shot, a chair screw, a bolt with thread and head complete, a boiler rivet, a staple or taper pin, etc., are produced.

A New Electric Safety-Lamp.

Mr. C. N. Gauzantes, a French electrician, has invented an electric safety-lamp that in point of size and weight seems to be superior to any electric safety-lamp yet produced. In commenting on it, an English exchange says: "In size the lamp is 4 inches wide, 2 inches broad, and about 8 inches high. Its weight when fully charged is about 3 lbs. 12 oz., and it gives a light of ¾-candle power. The first cost of construction is only $1.25, and the weekly cost of replenishing the battery is only 11 cents, while so little wear and tear do the internal parts undergo that the life of the lamp is reckoned to be five years. The metal which serves as the anode of energy is refined by a new and simple process, and allows a maximum generation of current without fear of rapid polarization, which has up to the present time proved the great obstacle to the employment of the direct source of electricity. The fluid which serves as an exciter is a new combination, giving in a single liquid all the properties necessary for the production of a regular and constant current, not only from a dynamic point of view, but also in the re-absorption of the sulphates thereby produced. The new fluid can be manipulated without the slightest danger in either preparation or use. The lamp has been tested in Belgium by the firm which manufactures the great bulk of safety lamps for the north of France, and the opinion of the firm was distinctly that the lamp was a good one."

Electrically Welded Steel Barrels.

A large industry is being built up at Barrow, Eng., in the production of steel barrels for the conveyance of petroleum. The barrels are made in halves by means of a compression in a mold, when hot. Afterward they are welded together by means of electricity. The barrels are intended for use by large oil-carrying companies engaged in the oil trade in the East, where the temperature has a great effect on wood casks, and results in so much leakage.—American Engineer and Railroad Journal.

Diverging Apparatus for Search Lights.

Search lights have become indispensable to steamers of all classes, and in military and naval operations. By their use objects miles away can be revealed and illumined in the darkest night, and their powerful beams of light can be thrown in any direction. One of the earliest applications of the search light in marine work was to vessels passing through Suez canal. Formerly the passage could only be made in daylight, and was very tedious and costly; now the electric light is at the service of every ship as it enters the canal, and the journey is, in nearly every case, pursued uninterruptedly, says the Chicago *Journal of Commerce*. A most excellent innovation has been made by the Suez canal authorities, who have pronounced that it shall be obligatory, after October 1st next, on all vessels passing through the canal by night to employ an apparatus for dividing the light of the projector into two divergent rays. Approaching vessels may, by this means, travel right up to each other without their respective helmsmen being blinded. The diverging apparatus which is to be used has been devised by one of the agents of the company.

Useful Information.

New Substitute for Sugar.

Paschkis has recently given some attention to the properties of this new sweetening agent, and comes to the conclusion, with reference to its relative value as compared with sugar, that it cannot be denied that sucrol fully accomplishes one object for which sugar is used, viz., that of sweetening food and drinks. It has a pure, sweet taste, has no disagreeable taste accompanying or following its use, and does not spoil the food to which it is added.

Coffee, tea and lemonade that are sweetened with sucrol taste very good; their sweet taste never becomes disgusting or sickening. Sucrol is best used for sweetening liquids that have a comparatively high specific gravity. Those that are lighter and bitter will not have this taste covered by sucrol, on account of their want of viscosity and the small quantity of sucrol necessary for sweetening.

Something similar is known to be a fact with sugar; a purely bitter taste will not even be neutralized by much sugar (viz., quinine); it is only combined with the sweet. How much sweeter sucrol tastes than sugar cannot be stated exactly; according to his gustatory experience with aqueous solutions and with various foods and drinks, he believes it is about 200 times as sweet as sugar, maybe more. At all events, the quantity of sucrol necessary to sweeten a liquid is much too small to give it the same density as it possesses when sugar is employed. This shows very markedly in tea or coffee.—American Druggist.

The Opal.

There are three varieties of this famous gem. Ranking first comes the oriental; as second in value, the fire; and, lastly, the common opal. The affection for this treasure, as expressed by the ancients, can hardly be believed. Nonnius, a Roman senator, absolutely preferred exile to parting with a brilliant opal of the size of a filbert, which was earnestly coveted by Marc Antony. An opal ranking as third among the finest in the world is described as having three longitudinal bands of the harlequin kind, from the uppermost of which rose perpendicularly the most resplendent flames. It measured nine inches by six.

In the last century a very round and brilliant opal was the property of the amateur Fleury. Another, said to be fascinatingly vivid, was owned by a noted French financier. These two were regarded as marvels of beauty among gems. On account of the thousand fissures of the stone, engraving is always difficult and often impossible. A head of Sappho engraved upon a "presumable opal," an antique, has been highly valued and carefully studied by experts in gem lore. It is catalogued, so we read, among the treasures of a princely home.

Origin of Grain.

Nearly all the grains now in use are of unknown antiquity. Wheat was cultivated in all latitudes as far back in the past as we have authentic knowledge. Barley is thought to have originated in the Caucasus, but it was known and used everywhere in the most ancient times. Oats, like rye, was unknown in ancient India and Egypt and among the Hebrews. The Greeks and Romans received it from the north of Europe. Had there been an early civilization on the continent the wild oats found here and there would probably have developed into the useful cereal now considered absolutely essential to the proper nourishment of horses.

This continent is credited with having given Indian corn to the Old World, but this useful cereal was doubtless known in India and China many hundred years before the discovery of America. Cotton was used for making garments in India at a date so remote that it cannot even be guessed at. The fact is mentioned by Aristotle. The first seeds were brought to this country in 1621. In 1666 the culture is mentioned in the records of South Carolina. In 1736 the culture was general along the eastern coast of Maryland, and in 1776 we heard of it as far north as Cape May.

The Sun and the Stars.

The sun is a star, and the stars are suns. This fact has been a familiar one to astronomers for many years. That the stars shine by their own inherent light and not by light reflected from another body, like the planets of the solar system, may be easily proved.

That many of them at least are very similar to our own sun is clearly shown by several considerations. Three facts prove this conclusively. First, their great intrinsic brilliancy, compared with their small apparent diameter—a diameter so small that the highest powers of the largest telescope fail to show them as anything but mere points of light without measurable magnitude.

Second, their vast distance from the earth, a distance so great that the diameter of the earth's orbit dwindles almost to a point in comparison. This accounts satisfactorily for the first fact. Third, the spectroscope—that unerring instrument of modern research—shows that the light emitted by many of them is very similar to that radiated by the sun.

Their chemical and physical constitution is, therefore, probably analogous to that of our central luminary. The red stars certainly show spectra differing considerably from the solar spectrum, but these objects are comparatively rare, and may, perhaps, be considered as forming exceptions to the general rule.—Gentlemen's Magazine.

The Human Ear.

Few people realize what a wonderfully delicate piece of mechanism the human ear really is. That which we ordinarily designate as the "ear" is, after all, only the mere outer porch of a series of winding passages which lead from the world without to the world within. Certain of these passages are filled with liquid, besides having membranes stretched like parchment curtains across the corridor at different points. When a sound wave strikes these they are

thrown into vibrations and made to tremble like the head of a drum does when struck with a stick or with the fingers. Between two of these parchment-like curtains a chain of minute bones extends, which serves to tighten or relax the membranes and to communicate vibrations to them. In the innermost place of all, a row of white threads, called nerves, stretch like the strings of a piano from the last point from which the tremblings reach, passing thence inward to the brain.—Hall's Journal of Health.

To Take Foul Air Out of a Well.

The well was to be cleaned, but the man who took the job was afraid to go down until he had ascertained the quality of the air at the bottom. He let down a lighted candle, and when it descended to within six feet of the bottom it went out as suddenly as though extinguished by a whiff of air. That was all he wanted to know. He was then sure that the well had poisonous gas in it, and took a small umbrella, tied a string to the handle and lowered it open into the well. Having let it go nearly to the bottom, he drew it up, carried it a few feet from the well and upset it. He repeated this operation some 20 or 30 times, with all the bystanders laughing at him, then again lowered the light, which burned clear and bright even at the bottom. He then condescended to explain that the gas in the well was carbonic acid gas, which is heavier than air, and therefore could be brought in an umbrella just as so much water. It was a simple trick, yet perfectly effective.—Globe Democrat.

Automatic Bed.

A Bombay man has constructed a bedstead priced at 10,000 rupees, and I append the description for the benefit of my Birmingham readers: "It has at its four corners four full-sized gaudily dressed Grecian damsels, those at the head holding banjos, while those at the right and left foot hold fans. Beneath the cot is a musical box, which extends the whole length of the cot, and is capable of playing twelve charming airs. The music begins the moment the least pressure has been brought to bear from the top, which is created by one sleeping or sitting, and ceases the moment the individual rises. While the music is in progress the lady banjoists at the head manipulate the strings with their fingers and move their heads, while the two Grecian damsels at the bottom fan the sleeper to sleep. There is a button at the foot of the cot which, after a little pressure, brings about a cessation of music, if such be the desire of the occupant."—The Ironmonger.

New Ship-Saving Device.

An Englishman proposes to divide up a ship into air-tight compartments, the doors to which are fitted with proper packing. Then from each chamber a tube leads up on deck, all uniting with a "junction chest," connected with an air compressor. By this means, and with the aid of switches, the inventor believes it possible to force the water out of any compartment when the vessel has sprung a leak. In the switch-room there are to be electrical indicators which will reveal the presence of water in any part of the ship. By a modification of this device it is claimed a sunken vessel that has been suitably constructed can be raised by pumping in compressed air from above.

Queen of the Evening Sky.

Venus, after an absence of nearly a year, has again made her appearance as an evening star, and may now be seen for a short time in the early evening in the west. She will continue to adorn the western skies during the remainder of the year, growing brighter and brighter, and not reaching her greatest brilliancy until the 6th of January next.

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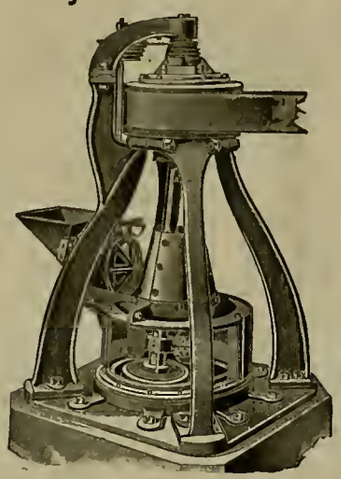

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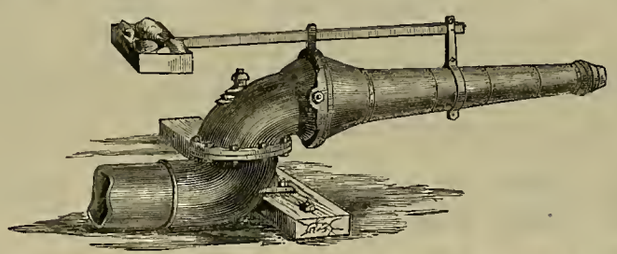

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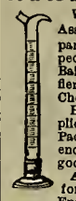

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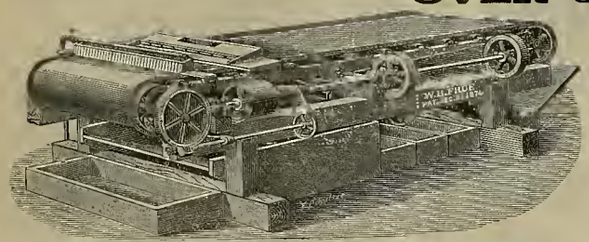

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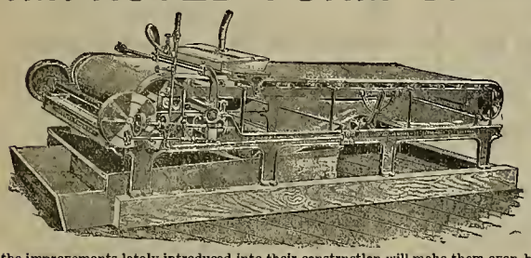

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(Signed) R. G. HART, Sr., Manager Texas and Cleveland Cons. Mining Co's.

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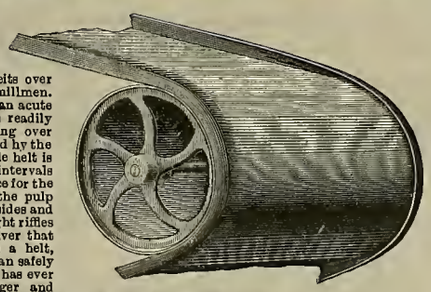

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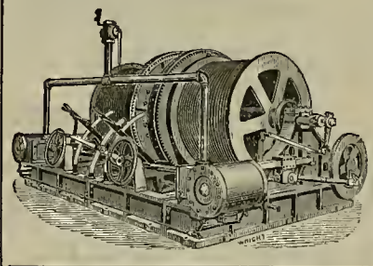

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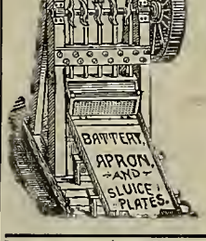

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Coast Industrial Notes.

—Fires at the following places have destroyed property in varions amonnts: Biggs, $8000; Visalia, $1200; Boise (Idaho), $37,500; San Luis Obispo, $4000.

—The Blatchley sawmill, owned by Dolley, Rousseau & Co., at Sierraville, Cal., and 600,000 feet of lnmber were burned Sunday. Ths loss is $10,000; insurance $2000.

—The Pacific Mail Company has promulgated recent orders to cut down salaries all along the line. It ls a reduction of from 15 to 40 per cent. The cut is to go into effect September 1st.

—The Printers' Union at Victoria, B. C., bas reduced the scale for newspaper work ten per cent. Machine hands will get $22 per week; hand compositors, night, 45 cents per thousand; day, 40 cents.

—A movement is being made to form an electric-light company to furnish not less thsn 600 lights for Placerville, Cal. It will be incorporated, if sufficient subscriptione are obtained, with a capital stock of $10,000. Of the amount, $4000 must be subscribed. Chas. Green is eoliciting snbscriptions.

—Friday, Sept. 1, the Southern Pacific and the Santa Fe pnt a rate into effect to the Missouri river which will admit of a round-trip fare of $80 to Chicago, limited in time to 30 days east of the river and 60 days west. Notice to this effect hae been wired to the general passenger agents of all the mid-continent lines.

—The statement of the Southern Pacific Railroad Company shows that 2,897,870 pounds of freight were shipped from San Joss last week. Of this, 1,772,095 ponnds went East and 1,125,775 pounds to San Francisco and other points in California. The amount of green fruit sent East was 792,420 pounds and of new dried apricots 352,705 pounds.

—Commencing September 1st, the Southern Pacific will dispense with baggagemen on the Los Angeles division, between Los Angeles and Yuma, also probably on eome of the shorter rnns. Wells-Fargo express messengers will perform tbe work hitherto done by the baggagemen, the railroad company paying Wells-Fargo half the wages of the baggagemen.

—The Sbasta Lnmber Company have finished their railroad into choice engar pine lnmber, and things are very lively at the mill in Shasta county. Just now they are compelled to work a qnarter of a day overtime in order to fill their contracts for lnmber, and in view of the eteadily increasing demand they will put on a night crew at the sawmills on September 1st, thereby increasing their daily ent to 85,000 feet.

—The wages of workmen at the San Francisco slate quarry, Placerville, were reduced 20 per cent, and in consequence they all quit work. Slate-splitters have been receiving $3 psr day and ordinary quarrymen $2.50, and the redncotion makes these wages $2.40 and $2. E. Bind, the superintendent, has resigned. It is said that a new force of qnarrymen will be brought from San Francisco to carry on the operatione.

—A force of ship carpenters and joiners are at work on the steamer St. Paul, lying at Lombard-street pier. The steamer is to have extra staterooms, for the accommodation of cabin passengers, built on her, and will receive a thorough overhauling. The St. Panl is expected to be ready for service in ahout three weeks, and will then he placed on the run between this port and Mexican and Guatamalan ports, as far south as Champerico.

—Fire in the woolen mills at Merced Falls last week destroyed the mills, Nelson's flour mill, the warehouse belonging to the woolen mill, which held a large stock of goods, aud a residence owned hy Henry Nelson. The flonr mill was owned by John Ruddle, aud his loss is $25,000. The woolen mills were owned hy a San Francisco stock company, and the loss will amount to $150,000; about half insured. Thirty white men and forty Cbinese are thrown out of employment.

—Arrangements are ahout perfected for the establishment of a Roman Catholic convent and college at Pasadena. Plane for the convent are completed. A church will be built elsewhere. The college will represent an expenditure of $75,000 and will he erected hy the Redemptorists, an order of priests with headquarters at Milwaukee. It is proposed to locate the college on a commanding site at Altadena, north of Pasadena, on the line of the Mount Lowe railway. Work on the convent will begin eoon.

—The stockholders of the North Beach and Mission Railway Co. have authorized the directors to create a bonded indebteduess to the amonnt of $2,000,000, for the purpoas of making needed repairs. The motive power to be used has not as yet been definitsly decided upon, but in all probability electricity will be chosen. Tbe bonds will not bs placed npon the market for some time to coms, as a nnmbsr of preliminaries have to bs arranged, which will increase ths valns of ths property, in order to more thoronghly substantiate the loan.

—At a meeting of the Board of Supervisors of Berksley, Monday, a petition was presented signed by over 250 property-owners of Berkeley remonstrating against the removal of the Judson Powdsr Works, as has lately bssn pstitioned hy citizens of Bsrkeley. The signere of thia petition etate that they believe tbat all necessary precautions had been taken for safety by tbe Judson Dynamite Powder Company, and reqnest that the plant be snffered to remain where it is. The petition represents that the company employs a large force of men and disburses a considerable amount of money in wages.

—Sacramento has entered into a contract with A. L. Fish of San Francisco for construction of new water works. By the terme of the contract Fish is to supply the city with pure water from artesian welle at the rate of 3 1-10 cents per 1000 gallons. If the water is not up to the plans and specifications, the contract is rescinded. He is to put in a 30-inch main through the city at his own expense. This and and the erection of the plant means an expenditnre of between $80,000 and $100,000. The city will regulate and collect from consumers as now, merely bnying the water at wholesale from Mr. Fish. The contract can be ended at any time, and mnst be terminated at the completion of 30 years. At the close of 20 years the city can purchase the entire plant at a valuation to be fixed by arbitration, but not to exceed $300,000.

—The salmon pack of Frazer river for 1893 is abont as follows: Beaver cannery, 17,500; Wellington Canning Company, 15,000; Delta Canning Company, 15,000; Holly cannery, 15,000; Laidlaw's, 15,000; Harlock Packing Company, 15,000; Deas Island cannery, 10,000; Ewen's cannery, 40,000; Phœnix cannery, Brittania cannerv, Wadhame' cannery, Canoe Pass cannery, British American cannery and Birrell'e cannery, 103,700; Lnln Island Canning Company, 20,000; Pacific Coast Packing Company, 16,000; Imperial Canning Company, 16,000; Brunswick Packing Company, 16,000; Munn'e Sea Island cannery, 20,000; Stevenson Canning Company, 20,000; Canadian Pacific Canning Company, 20,000; Bon Accord cannery, 20,000; Terra Nova cannery, 15,000; Richmond cannery, 16,000. Total, 425,200. The pack already is the largest ever pnt up on the Frazer by abont 75,000 cases.

—The Navarro Mill Co. has been adjndicated insolvent, npon a petition presented in the name of the company. Sheriff McDade has been appointed receiver, nnder honds of $20,000. Thnrsday, Ssptember 28th, ie fixsd for the holding of a creditors' meeting, at which an assignee will be selected. The petition in insolvency is signed hy J. Fessenden Clark, the company's vice-president. He sets the liabilities of the concern at $1,038,719.85, which sum is divided up in the following manner: Open accouuts, $58,708.92; accepted drafts, $17,582.62; unaccepted drafts, $4,225.22; notes, $444,466.86; indorsements, $13,616.23; bonds eold, $1120; bonds pledged, $499,000. The creditors of the unfortunate company are very nnmerous, and while some accounts are hut small, there are others that amount to a very large percentage of the liabilities.

—The West Coast Plumbing and Supply Co. of San Francisco has failed under douhtful circumstances. The company was managed by L. D. Arnold, who organized it. With him were associated James A. Maguire and Fletcher F. Ryer, son of the millionaire who left him $250,000. The company closed the doors of its place at 58 First street on Augnst 1st. Arnold has disappeared, and his brother says he has gone East to effect a settlement with creditors. The shortage in the company is given at $40,000, owed mainly to Esstern firms. The principal creditors are: Eaton, Cole & Burnheim of New York, to whom the West Coast Plumbing and Supply Co. owed $6000; the L. M. Rnmsey Manufacturing Co., which has a hill for $4000; and the J. L. Mott Iron Works of New York, with $4500 on its hooks against Arnold and his associates. The Heep Manufacturing Co. is another creditor, aud Oscar S. Levy of 205 and 207 Market street holds a number of other claims aggregating nearly $1000.

Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MINE BONDED.—*Record*, Aug. 24: Ths Bell-Weather miue has been bonded to an Eastern company. At the Pionesr mine hoisting works hava been pnt up and it is proposed to sink a shaft 1000 feet before stoping is begun. The Zeile mine at Jackson employs 125 men. The ledge is 35 feet wide of low grade ore. Over $20,000 has been expended this year in repairs to shafts. At the South Eureka mine they have stopped sinking and are now engaged in opening np a level and drifting for the contact, which they will reach in abont 180 feet and probahly a month's time. D. Gntman the energetic mining operator, says this company has begun active operations on the Mattley Hill mine, adjacent to the Irma property, and will develop it on an extensive scale.

AT THE ALMA.—*Ledger*: The Alma people have commenced work at their mine site. During the week the superintendent, J. B. Francis, contracted for timbers with Lessley'e mill, and as soon as the necessary timbers are on the gronnd sinking will be commenced with a windlass. By the time 50 feet is reached they expect to have a hoist on the ground. They have decided to put in a eteam hoist, believing steam to be as oheap as water for power. . . . Snrveyor Reeves and B. F. Taylor spent a portion of this week snrveying the Argonant mine to determine the best pitch for the shaft and other data before commencing their einking on an elahorate scale.

Butte.

STRUCK A BONANZA.—Oroville *Mercury*, Aug. 24: The quartz ledge recently discovered by Messrs. English and Parks at Bangor, still continnes to prove of almost marvelons richness. The ledge is about two feet wide, is worked by a tunnel, and the ore crusher is a hand mortar. In fact, the vein is almost pure gold. In the last five days the owners have pounded ont by thie method $5184. Yesterday they extracted over four pounds of gold and the ledge shows no signs of giving out. Since its discovery the owners have taken out a fortune, and at the present rate will soon be independently rich. It is one of the biggest bonanzas ever strnck in the county.

A LIVELY CAMP.—Oroville *Mercury*, Aug. 29: Forbestown is now a typical California mining camp. It ie situated at the junction of two ravines, with only two or three hundred yards of level land to build on, while from all around slope precipitons hills. The narrow, level strip was the site of the old town, but now that new enterprises have necessitated the constrnction of new buildings, the hills are being utilized and houses are being erected in places which, to the resident of the valley, would eeem almost inaccessible. Bnt they are being built and there are not enongh to afford shelter to the inhabitants, and occasionally one sees a family living in a tent pitched beneath the pines. Within a year the town has more than doubled in population. It is the Mecca for every man looking for work, and there is consequently a large floating population. The three principal mines employ something over 200 men, while there are about 100 more working in the woods and on hnildings. The town now consiets of three hotels, three general merchandise etores, four saloons and a brewery, besides fruit and confectionery stores, barber shops, a drng store and photograph galleries, meat market, and several other smaller concerns. There are three large quartz properties being worked which have a total of 80 stamps, and two large reduction works. The hills are full of prospectors, and several more ledges are being opened. Taken altogether, Forbestown is now the liveliest camp in northern California, and indications are that it will continne so to be.

Calaveras.

A VALUABLE MINE.—Angels *Echo*: The Adelaide mine situated at Robinson'e Ferry, owned by Harvey Wood and sons, is heing steadily worked and hids fair to take rank with the richest mines in this section. Specimene of the ore taken from the mine recently are very rich. This mine has from time to time yielded large sums of gold.

THE JONES MINE.—*Echo*: The mill on the Jones mine situated at the mouth of Carson creek is kept continually running. The company is going to add 20 more stamps to the mill immediately. Mr. Roberts, the superintendent, tells us that the main shaft ie 250 feet deep, and levels are heing rnn at that depth. Sinking will be commenced in the near future.

El Dorado.

RENEWED ACTIVITY.—*Democrat*: There seems to he a renewed activity in mining operations throughont the county, which meaus prosperity and a general henefit to all. C. D. Lane was over from Angel's Camp last week and is pushing work on the Oro Fino. Chas. A. Bishop, of Portland, Or., ls making arrangements to open the Daly mine, near Grizzly Flat, in the near future, aud Frank Staples, hacked hy San Francisco parties, has commenced work on the Minnehaha mine, near Logtown, formerly known as the Capital mine. He has purchased the mill and machinery on the old Greenstone and has a numher of men already at work. A. D. Staples, near the same place, is at work on an extension of the old Pocahontas, and has a shaft down about 60 feet, taking out some fine-looking quartz, rich in free gold. He hae had several opportunities to hond thie mine, hut thinks he has a good thing and prefers to keep a controlling interest.

Mariposa.

FAST TIME.—Red Cloud Mins Cor. Mariposa *Gazette*: On Ssturday evening last the smployes gave an entertainment and dance to their many friends abont hsre to cslebrate tha event and completion of sinking the shaft in this mine another 100 fset, which was accomplished in the unprecedented time of 54 days, by six miners working 50 days on eight-hour shifts, two miners working two days on 10-honr shifts, and four miners working two days on 10-honr shifts; total, just 54 days, and with this additional 100 feet the shaft is now 700 feet in depth. At no plaes in ths sinking of ths 100 feet is the shaft in dimsnsions less than 8x10 feet, and in many places mnch larger, as the vein mattsr increased in places to 14 feet wide. Ths rock all the distance remained uniformly hard as at any other place in shaft, above, and every inch was blasting ground.

Mendocino.

COAL DEPOSITS.—Ukiah dispatch, Aug. 25: J. W. Miller, of thie city, arrived from Redwood valley to-day and reports the discovery on the Hargis place, ten miles from Ukiah, of a eix-foot vein of anthracite coal. The place was bonded some months ago by Dennie Quinleven, an old Pennsylvania coal miner. The shaft was down 30 feet when the vein was encountered, and the prospects of an extensiva deposit more than meets the expectations of Mr. Quinleven. The mine ie eituated on tbe right bank of Russian river and directly on the line of the proposed extension of the San Francisco & North Pacifio railway.

Mono.

LEDGE OF ONYX.—Bridgeport *Chronicle-Union*: W. E. Lindsey has located a claim 600x1500 feet on a ledge near Allen's Hot Springs, half a mile from Bridgeport, from which he has taken some fine pieces of onyx, of whioh there is an nnlimited quantity. Specimens are very fine. One large piece which he partially polished would make a beantifnl table top.

Nevada.

FINE CLEAN-UP.—*Union*: A splendid clean-up of 28 loads of ore has just been made from the Norambagua mine, Forest Springs, the ore yielding at the rate of $27 to the load, making an aggregate for the whole crushing of $756. The qnartz now being extracted looke better than that just crushed, and it is estimated that it will pay close on to $50 to the load. The ledge, though comparatively small, varying from 6 to 17 inches in sizs, is rich mining ore. Tha Noramhagua is owned principally by Wm. Campbell, the well-known Boston Ravine merchant.

GOON SHOWING.—*Telegraph*, Aug. 25: Mr. Thomas, who has a bond on the Spring Hill mine, and who is now taking ont ore from the ledge, to-day bronght to town 30 ounces of amalgam, the result of a crushing of about six loads of ore from the mine. About 1000 tons of ore on the dnmp are awaiting the mill. The rock will be crushed at the Crown Point mill.

THE YUBA MINE.—*Telegraph*, Aug. 23: The Yuha mine, in Washington district, after remaining idle quite awhile, is to be worked again soon. Superintendent Webber and Jamee Gribble, foreman, are now at the mine and had preparatory work begnn Monday. The pnmps will be put back and the water pnmped out of the mine, after which regular operations will be resnmed.

MINE BONDED.—Nevada *Telegraph*, Aug. 23: John C. Roberts has bonded the old Kate Haye Hill mine (now called the Oregon) and work of clearing the shaft, preparatory to active operations, will commence immediately. No active mining has heen done ou the Kate Hays Hill mine since 1866, and np to that time the ledge has yielded npwards of $90,000. The shaft is down about 240 feet and the ledge varies in eize from 10 inches to 4 feet, the average width being ahout 2½ feet.

PUMP STARTED.—*Telegraph*, Aug. 23: Superintendent George Mainhart informs ns that the pump at the Lone Jack mine was started this afternoon. The work of einking the shaft will he immediately commenced, and it will not he very long before the 1500-foot level will he reached.

GOOD GRAVEL MINE.—*Herald*: The Union Company, at Relief Hill, has as fine a gravel mine as can be found on the ridge. It has a great deal of ground opened up, and is still prospecting. The property is a paying one.

RICH SULPHURETS.—*Herald*: The Bellefontaine mine is turning out some heavily sulphuretted ore, said to be worth upwards of $200 per ton, and 20 tons of it are to he ehipped to the Selhy emelting works for reduction. Ten tons will be ready for shipment by the last of this week. The rock is so rich that some free gold can be seen in the snlphnrets, and it is really very fine ore.

STRUCK GOON ROCK.—*Transcript*, Aug. 20: The shaft at the Reward mine is down between 120 and 130 feet, and is being sunk as rapidly as possible. A good ledge of quartz has been struck, the rock showing free gold and being well charged with sulphnrets. It is the intention to sink the shaft 300 feet without etopping. When a depth of 200 feet is reached a level will he opsned up, and the working force will then be increassd.

NEW ENTEEPEISE.—*Transcript*, Aug. 20: What promises to prove an important mining venture is soon to be inaugurated on Sweetland creek, not far from the town of Sweetland. Hon. R. I. Thomas of Birchville, J. J. Ott and L. P. Schmidt of this city, and a gentleman of Sweetland, have made a location of 3000 fset on Sweetland creek. The claim is a continuation of the well-known Boss ledge. It is an immense deposit, similar in character to the famous Spanish mine at Washington. The ledge matter is composed of decomposed qnartz,

talc and ochre, and is 40 feet wide. Milling tests have been made from different portions of it and the results have been highly satisfactory. The owners will put a Huntington mill and other machinery on the mine before long.

Plumas.

PRODUCING BULLION.—*National-Bulletin*, Aug. 24: The Johnny Bull mine, owned and operated by Sam Firmstone and others, has been producing bullion of late in most satisfactory quantities. The mill has only five stamps, but during last month $2030 was realized from the cleanup, the ore yielding from $10 to $11 per ton. Crushing is in progress this month on equally as good ore. This is a very good showing for a small mine which can be operated with four or five men and little expense outside of the employment of these.

San Bernardino.

THE YUMA PLACERS.—San Bernardino dispatch, Aug. 18: About September 1st a large English company, together with several home capitalists, including Wilbur and Chandler, and A. Caldwell of Riverside and L. C. Moreland, will begin working the placer claims about 15 miles above Yuma, on the California side of the Colorado river. Immense pumping works have been erected—one on the banks of the river, with 500-horse power, which will raise a large stream of water to the high bluffs above, from where it will be conveyed in steel pipes to the placer mines, four miles away. After the water is used once, it will be again pumped back by a second pumping plant and used over and over again. The plant is completed except for the laying of the pipe line. It is thought that about 300 men will be employed on the day and night shifts. Contracts for labor are being made.

Shasta.

IMPROVEMENT AT SHASTA.—*Democrat*: Jim Hill says the mines around the old town of Shasta are improving right along, and several good properties are developing finely. Mr. Fitch, the gentleman from Santa Cruz who was in the county a month ago, and who bought the mine on the head of Middle creek, about a mile from Shasta, owned by the Drury Bros., will be in Shasta in about ten days, and intends to erect a custom quartz mill at Shasta, in the south end of town.

THE POOTEM MINES.—*Democrat*: W. A. Montgomery, writing to us from Pootem creek, has the following to say about the mines there: "I feel warranted in saying that I believe Mr. Bowley has one of the finest mines here in the State, and I consider it very valuable property and believe it will be worth half a million dollars or more when it is developed. The road is within three miles of the mine, and it will be completed in three weeks, and by that time the ferryboat will be running. Then Mr. Bowley can get his supplies in."

Siskiyou.

GOOD LEDGE FOUND.—Yreka *Journal*, Aug. 23: Kiernan & Dale are still prospecting their quartz ledge in Butte district, at the headwaters of Shasta river, and feel confident that they have a valuable permanent ledge of two to three feet thick, with an abundance of water close at hand for running the quartz mill and washing out the gold, also plenty of timber for building and firewood. Other parties are working locations in the same vicinity, with favorable indications of success, to make that section one of the richest quartz-mining districts in the county. K. McPherson, who has been prospecting on Greenhorn for some time past, has a small rich ledge, from which he realizes good pay by the slow process of pounding the quartz in a mortar. He has been troubled with the la grippe lately, so that he has not been able to do much work. He is in hopes of eventually finding the ledge much wider and permanent, as he sinks down, to justify putting up a mill. John Napper, who has a good paying claim on Trail gulch, Humbug creek, alongside of the grade from the summit of the mountain to Humbug crossing, is now building a good ditch from the gulch to his claim, so as to be in readiness for securing the gulch water when the winter storms commence. The Bellevue quartz mine at Salmon river, near Sawyer's Bar, has been yielding good average pay right along, ranging from $37.50 to $45 per ton. It is owned by C. Nicolet, an enterprising and persevering miner, who crushes the quartz in an ingenious arrastre rigged up by himself. The ledge varies from two to three feet in width, from which over 400 tons has already been taken out. He is sinking down on the lode, and feels hopeful of striking one of the largest and best-paying ledges on the coast.

RICH QUARTZ.—Yreka *Journal*, August 30: Dale & Co. still continue to find rich quartz in their ledge on the head of Shasta river, about 6½ miles west of Igerna. The lode ranges from 30 to 36 inches in width, and exhibits gold in good quantity to the naked eye. They are now building an arrastre for crushing and are making arrangements to put up buildings and get ready for winter work, so that the heavy snows in that section may not interfere with sinking shafts and tunneling. An expert has been sent to the mine from San Francisco by J. D. Frye, the well-known mining operator, with instructions to purchase, if possible. Dale & Co. have come to no conclusion yet what they would be willing to accept. J. Cavanaugh, of Edgewood, has located a ledge near Dale & Co., and placed three men at work for a thorough prospecting. The Greenhorn blue gravel mine, near Yreka, still continues to show good prospects, but the hot weather has dried up the water supply so that very little washing can be effected. As soon as the winter storms commence a large force can be employed to good advantage with the certainty of realizing a great amount of gold-dust every day. Mr. Sterns, the mining man, operating on south fork of Scott river, has bonded J. H. Pollard's mine at that place, and will give a thorough test in developing it. The Spencer quartz mine, on Siskiyou mountain, near Cole's railway station, continues to pay well, this quartz taken out yielding an average of $35 to the ton. The miners on Klamath river, in the Honolulu district, are now getting down to the bedrock in good shape, the storms of May and June having delayed commencement until later than usual for river mining. From this time on we may anticipate large returns of the glittering ore at every cut to the bedrock bottom of the old channels.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—Virginia *Chronicle*, Aug. 26: 1500 level—From the upraise started in the main south drift on the sill floor of this level, at a point 256 feet distant from the main shaft, a west drift has been started 52 feet above the sill floor and advanced 20 feet, connecting with the east drift from the bottom of the winze, sunk from the southwest drift from a point 75 feet above the sill floor. From the west drift a south drift has been advanced 50 feet. All these openings are in quartz formation averaging $5 per ton. 1600 level—The south drift started at the end of the east crosscut run from the main south drift at a point where it connects with the upraise carried up to the north drift on the 1500 level has been extended 7 feet; total length, 111 feet; continuing in porphyry and quartz of a very low assay value. From the end of this south drift an east crosscut has been started and advanced 21 feet in clay and quartz formation. 1650 level—Have continued making necessary repairs to the drifts on the sill floor of this level; and from the two sides of the drift run east (at a point 20 feet down) from the winze sunk from the crosscut run west from the main northwest drift; and from the end of the drift (in working upward) run south from that winze at a point 52 feet down, we have extracted during the week 427 carloads of ore—about 420 tons. Have shipped to Morgan mill during the week 417 1950-2000 tons of ore, the average assay value of which (per car samples) was $32.08 per ton. The average assay value (per battery samples) of all the ore worked at the mill during the week (383 tons) was $26.60 per ton. Bullion shipped to Carson Mint, assay value, $14,670.51.

OPHIR.—1565 level—The east crosscut started from the main drift on the sill floor of this level, at a point 108 feet south from the winze station, has been advanced 15 feet; total length, 55 feet; in a hard porphyry formation. Have raised to the surface 18 tons of ore, which had been stored in a drift on this level. Average assay value, $17.44 per ton.

MEXICAN.—On the 1565 level—The east crosscut from the north drift from the crosscut run east from the bottom of the winze, sunk from the 1465 level down to this level, near the south boundary line of the mine, has been extended 25 feet; total length, 227 feet, continuing in harder porphyry formation.

SIERRA NEVADA.—The intermediate tunnel on Cedar Hill has been advanced during the week 10 feet, making the total length 553 feet; the last 170 feet being in a mixture of quartz and porphyry; the face is now in hard rock. The joint Sierra Nevada and Union north drift from the west drift, 1520 feet west of the joint shaft, 900 level, is out a total distance of 93 feet; face in clay and porphyry.

POTOSI.—The east crosscut from the south drift, 220 feet south of the shaft, 850 level, is out 45 feet; face is in soft porphyry and streaks of low-grade quartz. The east drift, 73 feet above the 930 level, has been connected with top of north raise from 930 level; total length of drift, 155 feet. Extracted and sent to the mill the past week 336 tons of ore from the 930, 1000 and 1150 levels. Milled during the week 336 tons. On hand at mill 100 tons and 1950 pounds. Average battery assays, $25.30; average car-sample assays, $33.83.

CHOLLAR.—The north drift from the west crosscut, 930 level, is out 50 feet; face is in porphyry. From the face of this drift have started a crosscut west, which is now out 15 feet; face is in soft porphyry.

WARD SHAFT.—The west drift from the station, 820 level, is out 90 feet from the shaft; face is in clay and porphyry.

EXCHEQUER.—The west drift from the station, 820 level, Ward shaft, is out 90 feet from the shaft; face is in clay and porphyry.

BULLION.—The west drift from the station, 820 level, Ward shaft, is out 90 feet from the shaft; face is in clay and porphyry.

ALPHA.—The west drift from the station, 820 level, Ward shaft, is out 90 feet from the shaft; face is in clay and porphyry.

OCCIDENTAL.—We continue to extract from the west ledge on the 350 and 400 levels from four to five tons of ore per day of the average assay value of $27 per ton, as per car samples.

KENTUCK.—From the stopes above the track floor on the 1100 level we have extracted and shipped to the Santiago mill about 25 tons of ore per day of the average assay value, as per car samples, of $8 per ton in gold. The south drift from the joint east crosscut, on same level, is in 41 feet; face in low-grade ore, with branches of good ore.

HALE & NORCROSS.—On 900 level the west crosscut No. 1 from south drift was advanced 10 feet; total length, 62 feet; face in porphyry. 1300 level—Are cutting out a winze station north of the shaft on this level, preparatory to starting a new winze on the ledge. The preliminary work has disclosed fair-grade ore, which this winze will follow. Sinking will be commenced early in the coming week.

BEST & BELCHER.—200 level—West crosscut No. 3, started in northwest drift, 295 feet from our south boundary, has been extended 18 feet, passing through porphyry, clay and quartz. 900 level—West crosscut No. 5, started in southwest drift, 100 feet from west crosscut No. 4, has been advanced 13 feet; total length, 89 feet; face in hard porphyry.

GOULD & CUREY.—200 level—West crosscut No. 5, started in northwest drift, 432 feet from main west drift, has been extended 16 feet; total length, 602 feet; face in hard porphyry. At a point in west crosscut No. 5, 50 feet from northwest drift, we have started a south drift in a face of quartz giving low assays; this drift was advanced 12 feet during the week.

Silver Peak District.

THE SILVER PEAK MINES.—Walker Lake *Bulletin*, August 23: The party of experts and capitalists who have been examining the Silver Peak mines are satisfied that there is an immense quantity of low-grade ore in the mines, but they think that the price asked ($500,000) is exceseive, because that much more must be expended in building mills, tramways, securing water, etc. If they can come to terms with the owners of the property, they will work the mines on a large scale, giving employment to 500 or 600 men.

Pine Grove District.

GOOD PROSPECT.—Walker Lake *Bulletin*, Aug. 23: H. Norton and J. H. Rae are working a mine near Pine Grove. They have ont quite a quantity of ore that is now being hanled to the Gignonx mill for crushing. The mine is a gold producer. From a small quantity of ore worked at the Douglass mill a few weeks ago a little over $40 per ton was received.

ARIZONA.

THE YARNELL CAMP.—Prescott *Courier*: Wm. Robinson, recently returned from the Virginia Gold Mining and Milling Company's properties, reports that their Yarnell camp now presents an unusual scene of activity. Forty-five men are now at work and more men being put on; the mill is being run steadily on ore from a ledge recently struck in the lower drift, about 100 feet from the top of the mountain of ore; this is of higher grade than that previously worked. The main tunnel is still being pushed. The starting up of this prosperous camp, so near Prescott, is one of the most favorable signs of the times hereabouts. Miners say the amount of milling ore in sight is something enormous and inexhaustible.

A PROGRESSIVE DISTRICT.—*Southwest Sentinel*, Aug. 24: The strike which was made in the Pyramid Company's mine recently is showing up very well as development progresses. It is the most important strike ever made in the district. There are several mines in the Tres Hermanas district which will be worked as soon as a little better price can be obtained for silver. Some very fine bodies of silver-bearing lead ore have been exposed in that district and a good many men would have been at work there had it not been for the low price which has been paid for silver recently. Placer miners are having better success in the placer mines of this county this year than they have had before since the discovery of gold in the Pinos Altos district. There is little reason to doubt that the water supply will hold out for several weeks yet. The new mill which is being erected at Pinos Altos to treat ore from the Mountain Key mine will be completed soon and then the force at the mine will be increased. There are now about 20 men employed there. At Cook's Peak preparations are being made to work the Flower Queen. Repeated attempts have been made to work this mine, but the ore contains so much zinc that no very satisfactory results have been obtained. Pinos Altos is now one of the busiest camps in the Territory. The mills are running on full time and there is plenty of water to keep them going for the remainder of the year. More men are employed in the mines than have been employed there at any time since the closing down of the Pacific Gold Company's mine and mill and there are no idle men in the district. Considerable prospecting is going on out in the Burro mountains. There is an excellent prospect that there will be some very good gold mines opened there this year. Turquoise mining in the Burro mountains is attracting considerable attention just at present. Several new locations have been made recently and others are being developed. The stones found are generally of very fair quality, though many of them are a little off color.

BEING ENLARGED.—Globe *Silver Belt*: The Mammoth Gold Mining Company's mill on the San Pedro is being enlarged to 100 stamps. Experiments with the Raber process have proved very satisfactory. All the tailings can be worked by this process and a large amount of gold saved. It is estimated that the old process saved only 40 per cent of the gold, while the new one will extract 90 per cent.

BIG BUG DISTRICT.—Prescott *Courier*: Few people in Prescott know that within 24 miles of this city is a prosperous and rapidly growing gold-mining camp, with a population almost exclusively of working miners, numbering, according to different estimates, from 300 to 500. Such is Big Bug district, the foremost gold camp in northern Arizona at present, where the early riser hears the whistle of no less than six quartz reduction works, which are all within a radius of three miles.

IDAHO.

SNAKE RIVER PLACERS.—Placer mining on the Snake river, in Idaho, bids fair to develop into a growing industry. The Pocatello *Tribune* tells of a prospector who has been working near American Falls with a gold-saving machine of his own invention, and one that promises to make the banks of Snake river alive with prosperous miners. The machine is an inexpensive one (costs about $150) and one man can work it. He has at present only one of these machines at work, but is now preparing to get 20 more on the ground at once and will then put from 20 to 25 men to work at once. It is claimed that each machine will save $100 worth of gold a day.

OREGON.

MUCH PROSPECTING.—Brownton Cor. Josephine *Courier*: Most of the miners are about through cleaning up for the season, and although they do not laugh over the outcome or report any big thing, they try to be satisfied and hopeful for the coming winter. Crosby & Hopkins have struck what they think is the old Cowen lode. The rock prospects fairly. Although the vein matter is but small, it may open up better as they go down. W. A. Johnson has commenced sinking on his location. The ledge is quite large and looks very favorable. Dicky is now working with the Briggs & Doney Company on McDonna gulch. This company are getting their ditches in shape for a long season's run. I have not heard from Sucker Creek basin, except that the men are all at work and quite sanguine of making a big run and cleanup.

CLEANING UP.—Jacksonville *Times*, Aug. 18: The Sterling Mining Co. is engaged in cleaning up, and the prospects for a good yield are excellent. A. W. Sturgis, of Jackass district, has finished this season's work and made a big cleanup, running well up into the thousands. It is said that a genuine fissure vein has been struck at Dr. Hinkle's mines in Sardine Creek district. The ore prospects very well. Simmons, Cameron & Co., who are operating an extensive mining claim in Waldo district, Josephine county, have finished cleaning up and realized handsomely from the past season's work. The placer mines of Jackson and Josephine counties yielded better during the past season than for years past. Many thousands of dollars of gold have been put into circulation during the past few months. W. H. Hampton, the well-known mineralogist-negotiated the sale of the Dysert mining property in Grave Creek district to Portland capitalists, and is taking steps to acquire adjoining placer mines. It is the intention to incorporate a stock company and inaugurate a big mining enterprise.

CROWNING WORK.—Ashland *Tidings*, Aug. 18: Col. Thos. Ewing returned Tuesday morning from Seattle, to look after his mining operations, and is crowding work upon the prospect tunnel at the Mountain Lion mine. . . Geo. F. Gund, of Seattle, with whom Lon Edwards is interested in mining investments, arrived last Saturday and spent several days visiting, with Mr. Edwards, the several mines where they have prospect work in operation. Mr. Gund is well satisfied with the prospects, and expects to spend more time here during the fall. The Anderson land at Wagner Creek Gap, the St. Patrick claim owned by Jos. A. Wilson, the Park ledge owned by Vannatta and others, and the Hope mine, are some of the properties bonded by Gund & Edwards. . . Beagle & Brunk have bought a placer claim of a Chinaman on Gronse creek, just above the Patterson mine. They already had the Beagle claim on Beaver, just below the Patterson mine. Charles Cowles and a partner have located a placer claim on Mt. Sterling, below Flett's mine, and will prospect it this fall. . . Tom Hurd reports that Jack Morris has just worked up a $700 pocket of gold quartz in the Blackwell district. Morris has made a scientific study of this sort of mining, and has found and worked 13 pockets in that region within the last six years, from which he is several thousand dollars ahead.

CLEANING UP.—Jacksonville *Times*, Aug. 25: The Sterling Mining Co. is engaged in cleaning up, and the prospects for a good yield are excellent. The Mountain Lion mine in Missouri Flat district has been bonded to John H. Simons for $12,000. Work on the Clark mine in Williams Creek district will soon be resumed, Portland parties having purchased it. Prospectors still continue to be numerous and a great deal of prospecting is being done in Jackson and Josephine counties. Messrs. Burke & Drew, who purchased a mine in Jump-Off-Joe district, are expected to return in a few days with machinery to work the mine. F. Grob and J. Nunan, representing Joe Braendle, this week bonded their quartz mine in Jackson Creek district to Fred Hogg, Judge Holcomb and others. The placer mines on Wolf and Grave creeks have paid better this season than for a long time past. It is said that at least $10,000 will be cleaned up at the Ruble mine.

GREEN HORN DISTRICT.—Word comes from the Greenhorn district that the mines continue to improve as development work progresses, says the *Democrat* of Baker City, Or. There are quite a number of properties in that section which show up large bodies of ore, carrying both gold and silver, and with the monetary question settled, as is now probable, looking to the improvement of the present situation, the camp will take its place among the leading producing districts of the West.

RICH PLACERS.—Albany *Herald*: Three men from Mill City (Mr. Fuller, Mr. Wadsworth and a companion) have recently been opening a placer mine near Quartzville. They brought back with them $30 in coarse gold, taken out in two days, and have struck pay dirt in plentiful quantity. They have taken in tools and will work the claim steadily.

THE SIMMONS & CAMERON.—Rogue River *Courier*, Aug. 24: J. L. Wilder went down to Galice Creek Thursday, where he has a contract to put up 2500 feet of hydraulic pipe in the Simmons & Cameron mines. He intends manufacturing the pipe at the mines, and it will probably take three months to complete the job. This property is one of the "permanent" ledges of the county, and the owners hope, with the additional pipe, to be able to make a better showing than ever at the end of the coming winter's run.

Market Reports.

The Markets.

SAN FRANCISCO, Aug. 31, 1893.

The passage by the lower house of Congress of the Wilson repeal bill had little effect on the silver market. The fluctuation for the week has been no greater than in the past several weeks. The New York price dropped Tuesday 10 73 from 74¼ the day before. The Treasury Department yesterday was offered 260,000 ounces of silver at 74⅛@75¼ cents, and purchased 30,000 ounces at 74¼ cents. The same price was tendered for the remainder.

The mints in India were closed to free coinage on June 26, 1893. It was feared that this would seriously affect the demand for fine silver in that quarter. It is gratifying to know that these fears have not been realized. For the six weeks following the closing of the India mints, the shipments of silver from Europe to India, China and the Straits compare as follows with the corresponding period last year:

	1892.	1893.
To India	£948,300	£538,200
To China and Straits	342,500	817,500
Total	£1,290,800	£1,355,700

Referring to these statistics, the London *Statist* says: "The consumption of silver does not and will not abate. The recent fall was due to the policy of the Indian Government, and was not the consequence of a cessation of the demand." This will be good news to American silver producers.

Large Treasure Exports.

The shipments of treasure from San Francisco by sea this month have been unusually large, especially Mexican dollars, while a large amount of silver bullion has also been sent away. There have been 1,326,921 Mexican dollars and $232,000 in silver bullion already shipped. Gold coin amounting to $99,000 has been sent to Honolulu.

Imports of Tin Plate.

The following table shows the exports of British tin plate to the United States for each month in the past five years in tons of 2240 pounds:

	1893.	1892.	1891.	1890.	1889.
January	23,498	17,554	32,018	23,613	28,471
February	20,190	24,268	28,253	18,334	27,879
March	31,334	22,789	38,638	17,245	30,936
April	31,651	31,061	45,208	23,373	31,017
May	26,988	23,799	53,569	25,619	31,929
June	26,759	23,550	53,539	30,793	29,269
July	22,248	24,750	4,823	37,011	23,718
August	.....	24,221	5,629	25,519	26,756
September	.....	22,535	11,139	25,557	28,890
October	.....	19,901	12,461	36,955	25,647
November	.....	20,634	14,831	28,330	30,345
December	.....	23,417	13,536	25,709	21,756
Totals	.....	276,479	325,145	318,108	336,692

The Iron Outlook.

The situation in the iron trade has not improved, says the *American Manufacturer*, Aug. 25th. It is claimed in some quarters that there are evidences of an expansion of trade, but it would be difficult to support such a statement by facts. It is true that the volume of business shows no increase. Bright anticipations are indulged in, but buyers are waiting for some evidences of increasing confidence, and firmer prices, before placing heavy orders. Easier monetary conditions will change everything. The only statement warranted by the facts is that there is a general anticipation of improvement, and honest intentions of entering upon active work as soon as it is safe to do so. Favorable reports come from Chicago and one or two other Western markets. Throughout the East sluggishness prevails, and resumption of work is progressing but slowly. Stocks are very low, and this is a strong and encouraging feature of the situation. The railroad companies contemplate large purchases as soon as they are assured that the most favorable time for action has arrived.

Silver and the Metals.

NEW YORK, Aug. 31.—Following are the closing prices for the week:

	Silver in— London.	N. Y.	Copper.	Lead.	Tin.
Thursday	34⅝	74¼	9 60	3 50	18 90
Friday	34	73	9 50	3 45	19 02½
Saturday	34	73	9 50	3 45	19 02½
Monday	34	73	9 40	3 55	19 10
Tuesday	34	73	9 50	3 72½	19 10
Wednesday	34½	73¼	9 50	3 56½	19 25

San Francisco Metal and Coal Market.

ANTIMONY.		QUICKSILVER.	
Per lb	— @ 13	Home trade, pr. flask	40 00 @40 50
BORAX.		STEEL.	
Refined, in car lots	— @ 7½	English, lb	— @ 18
Powdered, do	— @ 7¾	Canton tool	— @ 8¼
Concentrat'd, do	— @ 6¾	Bl'k Diam'd tool	8½@ 15
All grades jobbing at advance.		Pick & Hammer	6½@ 10
COPPER.		Machinery	4 @ 5
Bolt	23 @ —	Toe Calk	— @ 4½
Sheathing	23 @ —	PIG TIN.	
Ingot, jobbing	— @ 20	Spot ℔ lb	21½@ 22
Do, wholesale	15 @ 16	COAL.	
Fire Box Sheets	22 @ 24	SPOT FROM YARD—PER TON.	
IRON.		Wellington	$8 00
Bar, base	— @ 2½	Greta	7 50
Norway, base	— @ 4½	Nanaimo	6 50
PIG IRON. Spot.		Gilman	6 00
Eglinton ℔ ton	—@—	Seattle	6 50
Glengarnock	27 00@—	Coos Bay	5 50
Am. Soft, No. 1	25 00@—	Cannel	9 00
Shotts No 1	27 00@—	Egg, hard	12 00
Puget Sound	—@—	Wallsend	7 25
Clay Lane White	30 00@—	Scotch Splint	8 00
Langloan	27 00@—	Brymbo	7 50
Gartsherrie	27 00@—	West Hartley	7 50
Barrow	—@—	TO LOAD—PER TON.	
Cargofleet	—@—	Australian	6 50@—
LEAD.		Liverpool Steam	6 87@—
Pig	— @ 4½	Scotch Splint	7 00@—
Bar	— @ 5	Cardiff	7 00@—
Sheet	— @ 6	Lehigh Lump	10 00@—
Pipe	— @ 5½	Cumberland	8 50@—
SHOT.		Egg, hard	9 00@—
Drop, sizes *smaller* than B, ℔ bag of 25 lbs	$1 75	West Hartley	7 50@—
Do do, B and *larger* sizes ℔ bag of 25 lbs	2 00	COKE. English, to load	$9 50@10 00
Buck, Balls and Chilled do, ℔ bag of 25 lbs	2 00	Do, spot, in bulk	—@12 00
		Do, in sacks	—@14 00
		Cumberland	9 50@—

Mining Share Market.

SAN FRANCISCO, Aug. 31, 1893.

The Comstock market has been exceedingly dull during the week. Practically no business has been done, and brokers have been engaged more in discussing the silver question than anything else. There was some activity, early last week, but it proved too much for the market in its weakened condition and it has shown no sign of life since. At its weekly executive session yesterday, the San Francisco Stock and Exchange Board extended the time for listing the shares of all gold mining companies, free of all charges, except the payment of the annual dues of $100, until January 1, 1894.

The latest reliable news from the Comstock is that the conference held between the representatives of the railroad, water and other leading interests, and the mechanics, was favorable. A conference with the miners is also to be held, but it is doubtful whether they will come into line on the reduction of expenses question as readily as the other interests have done. They may do so, however, in time. There was to be some further reduction in the force of miners in several of the mines to-day.

The following assessments were delinquent in the Boards to-day: Belcher, 25 cents; Ophir, 25 cents, and Chollar, 10 cents per share.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING AUGUST 8, 1893.

502,900.—INCUBATOR AND BROODER—J. W. Atkinson, San Jose, Cal.

502,948.—ARC LAMP—L. H. Buchanan, Pasadena, Cal.

502,940.—BICYCLE BRAKE—C. B. Burns, S. F.

502,950.—PUMP—Wm. Cameron, Milpitas, Cal.

502,001.—CHIMNEY—L. E. Clawson, S. F.

502,812.—MAGAZINE GUN—M. H. Durst, Wheatland, Cal.

502,902.—AMALGAMATION—G. H. Evans, S. F.

503,077.—PAPER BOX—Wm. Forsyth, Fresno, Cal.

502,906.—PLANE—Louis Hardt, Yuba City, Cal.

502,905.—ELECTRODE—J. N. & H. J. Harrison, S. F.

502,818 —ROTARY ENGINE—H. P. Holland, S. F.

502,820.—TRACTION ENGINE—B. Jackson, S. F.

502,908.—SPIRAL SPRINGS—W. B. Jackson, Portland, Or.

502,934.—DREDGER—W. B. Pless, S. F.

502,891. — COIN CONTROLLED APPARATUS — G. F. W. Schultze, Berkeley, Cal.

503,102.—PIPE MACHINE—F. M. Speed, S. F.

502,787.—BUCKLE—F. W. Swigart, Arroyo Grande, Cal.

502,839.—STAMP—C. W. Tremain, Portland, Or.

502,943.—CLOTH MEASURER—Wren & Oliver, Oakland, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FAUCET.—William F. Harris, S. F. No. 503,477. Dated Aug. 15, 1893. This device has for its object the provision of a simple, tight and readily-operated faucet, which, while adapted for various uses, is especially applicable to oil cans. It consists generally of a ported disk having its back flat and adapted to be soldered to the can. The face of the disk is socketed and has seated in it a ported disk valve to which the handle spout is attached. The adjacent faces of seat and valve are so ribbed and grooved as to bind tightly between them an intervening ported washer, whereby all leakage is avoided.

CHIMNEY.—Leonard E. Clawson, S. F. No. 502,901. Dated Aug. 8, 1893. This invention relates to improvements in chimneys and their connection with fire-places. It consists of an arched and inclined shell secured beneath the arch bar and serving as a bond to connect the chimney and the mantel, and to prevent any opening by shrinkage or otherwise through which fire can pass.

ELEVATOR SAFETY ATTACHMENT.—C. B. Labatt, S. F. No. 503,486. Dated Aug. 15, 1893. This invention consists of a series of movable stops fulcrumed in the vertical guide timbers between which the cage moves, and weighted cords connecting with said stops and passing over pulleys to connect with some movable part which will release the cords and throw the stops into the path of the cage in case the hoisting rope breaks.

STRAP OR ROPE ATTACHMENT.—E. R. Robbins and L. L. Matrath, Sacramento, Cal. No. 503,497. Dated Aug. 15, 1893. This invention consists of a device to be applied to hitching straps and ropes, which allows the strap to be adjusted and secured at any desired length. This is effected by loops or keepers through which parts of the strap pass, and within which it binds or locks at any desired point, and a snap-hook or other fastening for the free end of the strap.

BRAID RACK.—August H. Marten, San Jose, Cal. No. 503,488. Dated Aug. 15, 1893. This invention relates to a novel and convenient means for displaying braid, laces and similar articles, and consists of a permanent or movable slotted base and light racks having projecting corners which are adapted to fit the slots in the base, while the central portion serves to receive the material. This construction allows a great number of racks to be set on edge side by side, and any one can be removed for exhibition or replaced at will.

AMALGAMATOR.—Jos. S. Johnson. No. 503,765. Dated Aug. 22, 1893. This apparatus consists of an endless traveling inclined belt passing around drums at each end and provided with hinged metallic overlapping plates upon which the valuable metals are amalgamated, and a series of brushes impinging upon the upper surface to keep them bright and clean. Below the belt is a washing tank, into which the plates dip as they pass along the lower side of the belt, the hinges allowing them to swing down for this purpose.

FAINOR OR TRIMMING HOLDER.—J. M. Schlesinger. No. 503,752. Dated Aug. 22, 1893. This invention consists of a card or holder upon which fringe or trimming may be wrapped, said holder being provided at opposite ends with studs by which the holder is suspended from a suitably constructed standard, so that the goods are easily inspected without handling, and any card may be removed for the purpose of removing goods therefrom.

BASEMENT VENTILATOR.—Peter H. Jackson, S. F. No. 503,484. Dated Aug. 15, 1893. This invention consists of a tubular extension down from the open grating in the roof of a basement extension, and a pan, of larger diameter than the tube, suspended beneath it so as to catch the drip from above and allow a free circulation of air.

LUBRICATOR.—Chas. E. Travis, Los Angeles, Cal. No. 503,506. Dated Aug. 15, 1893. This invention consists of a cylindrical receiver, into which the oil descends after having lubricated the moving part, and from which it is pumped up to the oil cup again by a reciprocating piston moving in the receiver as the latter reciprocates.

TAKE PROTECTOR.—Edwin H. Black, Campbell, Cal. No. 503,759. Dated Aug. 22, 1893. This invention consists of a series of metallic strips, vertically disposed directly against the base of the tree and separated from each other, said strips extending from the surface of the ground down to the point where the main roots diverge. The object is to prevent gophers from girdling the tree.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, August 31, 1893.

9:30 A. M. SESSION.

200 Belcher	40c	100 Ophir	80c
400 Bulwer	20c	100 Sierra Nevada	25c
60 Mexican	55c	200 Y Jacket	55c

2 P. M. SESSION.

600 Belcher	40c	100 Ophir	85c
200 Best & Belcher	60c	470 Potosi	55c
50 Bodie	30c	400 Savage	35c
200 Hale & Norcross	55c	300 Sierra Nevada	30c
450 Mexican	60c		

Pacific Stock Exchange.

9 AND 10:15 A. M. SESSIONS.

300 Alpha	5c	600	1.20
100 Alta	13c	100 H & N	52c
100 Belcher	33c	500 Julia	2c
20	37c	100 S Nev	27c
100 B & B	54c	100 Ophir	75c
350	55c	900	80c
300 Bodie	24c	150	78c
100 Con. Cal. & Va	1.15	200 Yellow Jacket	52c

2:30 P. M. SESSION.

300 O O & V	1.25	200	57c
50	1.30	500	58c
100 S Nev	30c	350 H & N	55c
100 Yellow Jacket	55c	50	56c

Complimentary Samples.

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ASSESSMENTS.

COMPANY AND LOCATION.	NO.	AMT.	LEVIED, DELINQ'T AND SALE.	SECRETARY.
Alhambra M Co, Nev	17	25c	July 14, Aug 18, Sept 11	F S Schwarze, 324 Washington
Alpha M Co, Nev	60	25c	July 31, Sept 4, Sept 23	E B Holmes, 309 Montgomery
Alta M Co, Nev	43	15c	April 25, Aug 21, Sept 8	L Osborn, 309 Montgomery
Belcher M Co, Nev	40	25c	July 31, Sept 4, Sept 25	A L Perkins, Mills Bldg
Bodie Cons M Co, Cal	16	150	July 24, Aug 28, Sept 25	M E Willis, 309 Montgomery
Bulwer M Co, Cal	8	10c	July 20, Aug 31, Sept 22	L Osborn, 309 Montgomery
Carmelo Land and Coal Co, Cal	6	$2	July 21, Sept 1, Sept 20	R McDohle, Mills Bldg
Chollar M Co, Nev	35	10c	July 31, Sept 5, Sept 26	C E Elliott, 309 Montgomery
Clinton M Co, Cal	2	15c	Aug 9, Sept 16, Oct 2	C E Gunn, Mills Bldg
Confidence S M Co, Nevada	23	25c	Aug 7, Sept 11, Oct 2	A S Oroth, 414 California
Dora Gold Mining Co, Cal	1	5c	Aug 25, Sept 25, Oct 25	Chas J Blumcutnal, 415 Montgom'y
Eclipse M Co	5	20	July 27, Sept 4, Sept 25	O Tum Suden, 216 Bush
Evening Star M Co, Cal	10	1c	Aug 9, Sept 12 Sept 30	J J Scoville, 320 Sansome
Exchequer M Co, Nevada	36	15c	June 23, Aug 31, Sept 21	C E Elliot, 309 Montgomery
Gold Mountain M Co, Cal	5	$1	July 13, Aug 16, Sept 4	J F D Curtis, 325 Montgomery
Gray Eagle M Co, California	33	3c	July 10, Sept 6, Oct 4	Chas O Harvey, 309 Montgomery
Herold M & M Co., California	6	1½o	Aug 10, Sept 16, Oct 3	M E Willis, 309 Montgomery
Inyo Marble Co, Cal	21	5c	Aug 8, Sept 12, Oct 12	W W Sargeant, Mills Bldg
Jackrabbit M Co, Cal	4	50	Aug 10, Sept 15, Oct 6	Thos Wetzel, 320 Sansome
Justice M Co, Nev	55	10c	July 31, Sept 5, Sept 25	R E Kelly, 309 Montgomery
Kentuck Cons M Co, Nev	8	10	July 11, Aug 15, Sept 5	A Waterman, 309 Montgomery
Lady Washington M Co, Nev	9	10c	April 15, Aug 9, Aug 30	L Osborn, 309 Montgomery
Mexican M Co, Nev	48	25c	July 17, Aug 22, Sept 12	C E Elliott, 309 Montgomery
Occidental Con M Co, Nevada	13	10c	June 22, Aug 16, Sept 6	A K Durhrow, 309 Montgomery
Ophir M Co, Nev	60	25c	July 31, Sept 4, Sept 25	E B Holmes, 309 Montgomery
Potosi M Co, Nevada	33	25c	July 11, Aug 15, Sept 5	C E Elliott, 309 Montgomery
Seg Belcher and Mides Con M Co, Nev	12	10c	July 26, Aug 29, Sept 18	E B Holmes, 309 Montgomery
Sierra Nevada S M Co, Nevada	105	20c	Aug 2, Sept 8, Sept 25	E L Parker, 309 Montgomery
South Eureka M Co, Cal	5	1½o	Aug 2, Sept 4	A Halsey, 318 Montgomery
Teresa M Co, Mex	11	100	Aug 9, Sept 11, Sept 27	K J Willats, 309 Market
Ventura Asphalt Co, Cal	1	50c	July 11, Aug 26, Sept 18	F. A. Brooks, Montg'y Block
Waterloo G M Co, Cal	1	15c	Aug 1, Sept 6, Sept 25	M Bailey, 18 Post
Yellow Jacket M Co, Nev	55	25o	July 29, Sept 5, Oct 9	W H Blauvelt, Mills Bldg

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE
Arnold G & S M Co, California	Annual	A Judson, 320 Sansome	Sept 5
Gem Mining Co	Special	A C Hammond, Room 39, Merchants' Exchange	Sept 9
Hidden Treasure M Co	Special	R B Jones, 144 Phelan Building	Sept 4

DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Bulwer Cons M Co, California	5	L Osborn, 309 Montgomery	Oct 20
Great Western Quicksilver M Co	25	A Halsey, 328 Montgomery	Oct 8
Mayflower Gravel M Co, California	10	D M Kent, 330 Pine	June 30
Pacific Coast Borax Co., California	1 00	A H Clough, 230 Montgomery	Jan 10
Standard Cons M Co., California	10	J W Pew, 310 Pine	July 25

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Cal. Debris Commission Notices.

NOTICE.—The California Debris Commission, duly appointed under the Act of Congress of March 1, 1893, having received a petition from N. C. Tully for permission to mine by the hydraulic process in the Omega Mining District, situated at the village of Omega, Washington Township, Nevada County, California, and to deposit tailings behind a dam in Scotchman's Creek, which discharges into the South Yuba River, and having also received a petition from Robert McMurray, attorney-in-fact for the Eureka Lake and Yuba Canal Company Consolidated, for permission to mine by the hydraulic process the Farrel mine, situated near Columbia Hill, Nevada County, California, and to deposit tailings behind a dam in an old hydraulic pit, gives notice to all concerned that a hearing will be held at the office of the Commission, Room 92, Flood Building, San Francisco, on September 4, 1893, at 1 o'clock P. M. On and before this hour and date, all parties interested may file affidavits, plans and maps in support of their respective claims. By order of the Commission: W. H. Heuer, Major, Corps of Engineers, U. S. A., Secretary.

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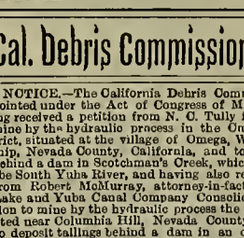

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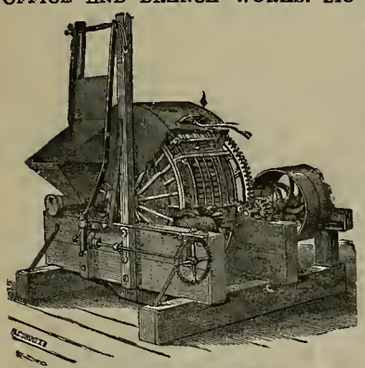

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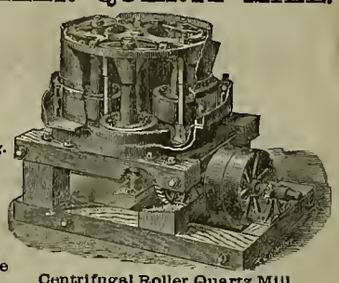

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Mechanics and Popular Science.

VOLUME LXVII.
Number 11.

SAN FRANCISCO, SATURDAY, SEPTMEBER 9, 1893.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

Colorado is All Right.

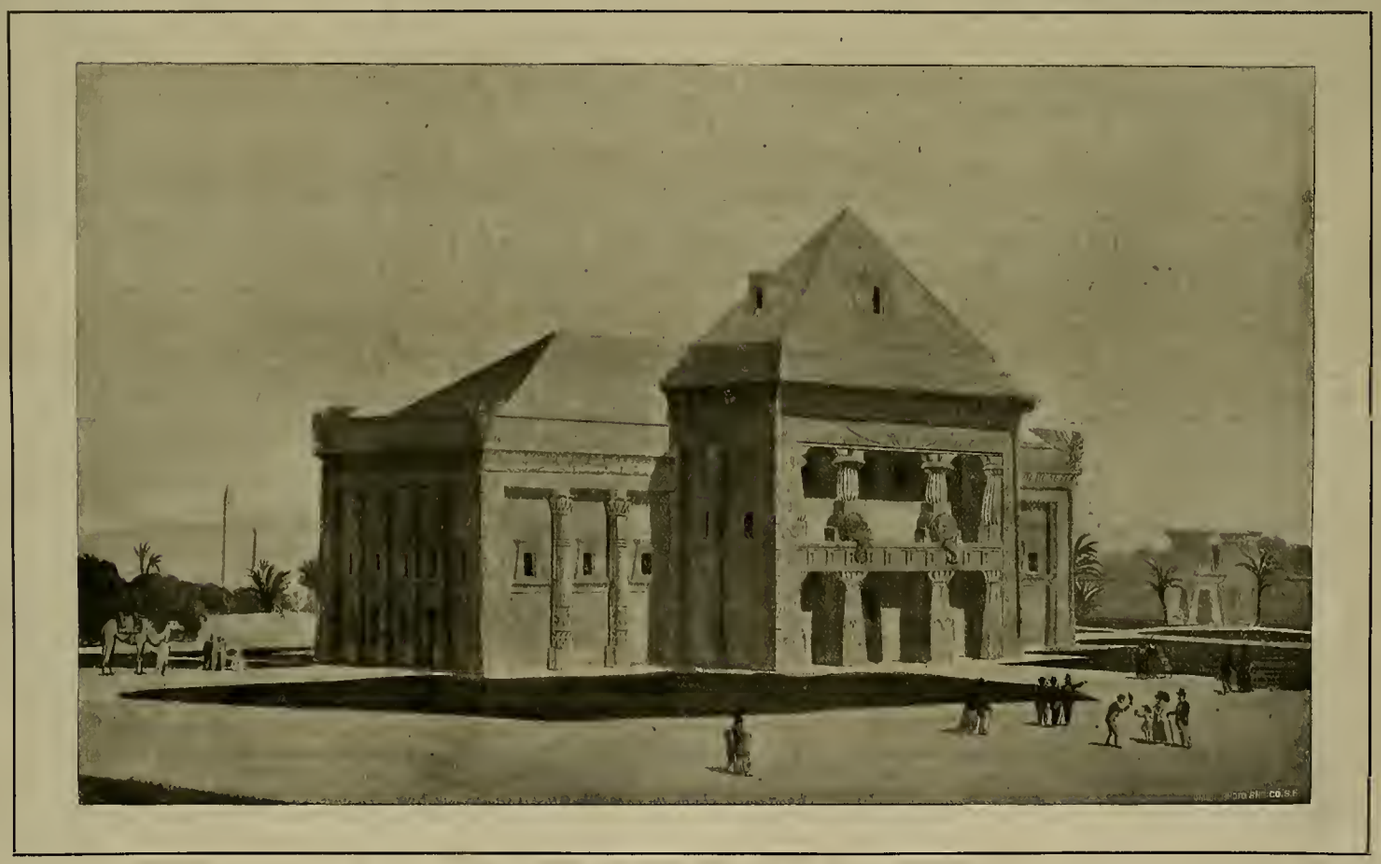
Next to California, Colorado is the largest gold producer in America; and the prospect now is that the Centennial State will take even more important rank in that branch of mining. There is no probability that it will surpass California, for obvious reasons; but its gold prospects and its gold mines, placer and quartz, will be developed as they never were before. The activity at Cripple Creek has assumed something like the dimensions of old-time excitement; and even tbe famous Leadville district will be converted into a gold region nf no small importance. Up to this time something like $12,000,000 in gold have been taken out altogether, and it is thought that the real deposits have not yet been touched.

A number of schemes for the development of placer mines are projected, several of which contemplate the employment of large capital and hundreds of men. John F. Campion, at the head of one enterprise, has acquired 5000 acres of lode and placer claims for development. Operations in the Leadville section heretofore have bsen confined to the pay dirt above the water level, and in consequence the diggings have never gone below 45 feet, or to water level. It is now proposed to sink shafts to bed rock, or to a depth of 100 feet. Pumping and hoisting machinery will be put in, the pay dirt raised to the surface, and there sluiced and washed. After the value of the pay dirt below water level has been thoroughly tested, it is the intention to construct an immense bedrock flume in the Swan river, and by means of modern and improved hydraulic apparatus, wash out the entire gulch to bedrock. The scheme is altogether a very large one and involves tho expenditure of a vast deal of money and the employment of much pluck, skill and energy. But Leadville appears to be equal to the situation. The debris of hostile legislation may fill the stream of Colorado spirit and enterprise; but the current is only diverted, not dammed.

One More Fair Building.

The announcement is made by the management of the Midwinter Fair that it is ready to receive bids for the construction of the Manufactures and Liberal Arts Building; and it is designed to begin the erection of other structures as rapidly as practicable. The whole Fair project is now declared to be in satisfactory shape. Collection of subscriptions has begun and responses by subscribers are said to be prompt and liberal. The outlook is for an exposition of very large dimensions, exceeding in importance and attractiveness any show ever held west of Chicago.

We present this week an illustration of the proposed Fine Arts Building, reprodnced from the *California Midwinter International Exposition Illustrated*, the official publication. The design is by C. C. McDougal, and it is both unique and original. It is planned to be fireproof, being constructed of brick. The building will be 60 feet wide, 120 feet long and 40 feet high. It is an example of Egyptian architecture, or, more correctly, perhaps, a collective illustration of the art of building as practiced by the Egyptians. The columns are grotesqnely ornamented, and in the second story take the form of or give place to elephants. Above the portico is the type of building classed with the world's wonders, and a small pyramid surmounts tbe vestibule. Tbe columns will all be of wood on the outside of a plain, solid rectangular fireproof brick structure. The blank walls will be decorated in Egyptian style, the acquille being naturally very prominent. The estimated cost of this structure is about $70,000. It will be lighted entirely from the roof, and will have apartments for the different branches of fine art work.



FINE ARTS BUILDING AT THE MIDWINTER FAIR.

TO-DAY is celebrated the forty-third anniversary of California's admission as a State. It has been said that this commonwealth is the only instance where a State was admitted into tbe American Union without previous probation as a Territory. But the orator who alludes to California as a "full-armed Minerva springing into existence," and asserts it was a sole and only instance of the kind, is mistaken. California was the eighteenth State to come into the Union, not counting the original tbirteen; other States came in on similar terms before and since. Kentucky in 1792, Tennessee in 1796, Maine in 1820, and West Virginia in 1863, are instances.

THERE is considerable activity in Montana gold properties, though the cessation of operations in silver mines has been pretty general. Several big deals have occurred about Butte, the last of which transferred the Broadway group of gold-bearing claims, located in the Silver Star district, to a company of capitalists for a sum amounting to nearly $100,000. The purchasers are M. J. Silvia of Santa Clara county, Cal., Mr. Davies of Salt Lake, H. G. Dean of Los Angeles and William Everett of Denver. The ground comprises four claims. The purcbasers intend to begin active operations at once.

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Our latest forms go to press on Thursday evening.

Entered at the S. F. Postoffice as Second-Class Mail Matter.

San Francisco, September 9, 1893.

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THE expressions of the president of the Anti-Debris Association in his annual address appear to indicate that all is not harmonious in that estimable organization President Stone declares substantially [see page 164] that the California Debris Commission knows what it is doing and should not be interfered with; that violations of law by hydraulic miners should be called to the attention of the commission by anti-debris friends; and that it is the business of the anti-debris attorney, in his appearances before the commission, simply to give information. Yet it has been represented by the self-nominated oracles of the anti-debris people that the association was opposed to the Caminetti law; that it doubted if the commission would or could afford adequate protection to the farmer under its operations; that the proposed impounding dams would not impound; and that the miners would hesitate at no device, however wicked and unscrupulous, to get the farmers at their mercy. We are also regaled by the spectacle of the attorney of the Anti-Debris Association, in defiance of this clear expression of the head of the organization, filing protests against the grant of licenses to mine; and, in public interviews, intimating that the courts will be appealed to if the protests are not headed. It is not to be presumed that President Stone counsels one thing before the association and urges another before the executive board, which has employed Attorney Devlin and apparently directed his course. The fair presumption is that the executive board is a law unto itself, and allows itself to be instructed by the association, its creator, only when it chooses.

STATE ASSEMBLYMAN THOMAS estimates that Nevada county has lost from $3,000,000 to $4,000,000 annually through the suspension of hydraulic mining. In course of an interview in a local paper he says:

Why, jnst think of it, onr assessment roll fell off one-half dnring the first year after hydranlicking was prohibited. This fact alone will convince the most obdnrate of the value of this indnstry. We need this money; we mnst have it. Look at the depression in financial and commercial circles. A great part of the panic might have heen averted if the hydraulic mines had continned their operations uninterrnpted. Very near $120,000,000 have heen lost to the cnrrency of the world through the snppression of these mines—a far greater amount than the Treasury reserve of the United States. In the San Jnan ridge we have one of the hest localities in the State of California. We have qnartz mines as well, and shortly you will witness a great hoom in mining in that part of the conty.

The assemblyman reflects the sentiments of practically all California, and particularly of the miners along San Juan ridge, who are enthusiastic over the prospect of resuming operations and are directing their steps to that end. Restraining dams will restrain. The Debris Commission thinks so, and, inasmuch as the Commission has the power to prescribe largely in what manner and under what conditions mines may be operated, its opinion is of great importance.

Gold and Silver Reserves.

According to a statement by Secretary Carlisle, the silver purchases for the month of August amounted to 3,898,022 fine ounces, costing $2,880,532. The total purchased under the Sherman Act has been 163,047,664 fine ounces, costing $151,804,170. The silver bullion on hand at the several mints is 134,625,492 fine ounces, costing $122,302,756.

From the bullion purchased, says the Secretary, 36,087,185 silver dolars have been coined, the bullion therein costing $29,502,117. The statement of the Secretary is incomplete and misleading, inasmuch as it tends to encourage an impression that there are immense quantities of useless and idle silver stacked in the vaults of the nation. There are not. Great sums of silver are there, but they are largely held to secure the circulation of a vast issue of silver notes. Silver is, or it ought to be, and the law contemplates that it shall be, the basis of our currency just as much as gold.

From the report of the director of the United States Mint, we find that the number of silver dollars in the treasury on December 31, 1892, was 355,054,049, and silver bullion $99,824,220, against which there were outstanding in circulation $322,035,011 silver certificates, redeemable in silver. The amount of gold coin in the treasury was $155,662,452; gold bullion, $81,826,630, against which there were outstanding $117,093,139 in gold notes.

Considering the bullion as money, the relation of the coin and the outstanding gold and silver notes is therefore as follows:

	Coin.	Notes.
Gold	$237,489,082	$117,093,139
Silver	454,873,269	322,035,011

Subtracting the circulation in notes from the coin in the treasury, we find the idle silver to be actually less in proportion than the idle gold in the treasury. Even if we take from the amount of gold the $100,000,000 reserve, we still find the proportions of active and idle money but very slightly against silver and in favor of gold.

It is the constitntional policy of the United States to maintain the use of gold and silver at parity. All acts of legislation are ostensibly framed to carry out this fundamental principle, and to maintain the currency of the conntry on a basis of bimetallism. But it has been the persistent and continuous effort of the Treasury Department, without warrant of law and in defiance of custom, the policy of our constitution and the will of the people, to place the country on an exclusive gold basis, and to depreciate silver, discourage its use, depress its value and disturb the relations of equality that naturally exist between the two metals. Evidence of this determination of the Treasury officials is found in the fact that $100,000,000 in gold is set aside for the redemption of about $450,000,000 legal tender (greenback) notes of the country, which are expressly declared by law to be payable in either gold or silver. The option of redemption in either metal is left explicitly with the Treasury Department. There exists no reason why the Secretary cannot exercise the authority reposed in him and carry out the intent of law. His pretext for insisting on exclusive gold redemption has been that it maintains confidence, and payment in silver would destroy confidence. But the attitude of the Secretary of the Treasury has been a most potent factor in exciting distrust of silver. The first step toward depreciation of silver by the Government itself was taken when the bimetallic principle of our laws was violated and the gold reserve was created. If there had been no gold reserve, but a gold and silver reserve, with no distinction between the metals, and if the Treasnry Department had, from the resumption of specie payment, insisted upon its prerogative of redemption in either money, the present sorry financial condition of the country would never have been brought about.

The chief responsibility for the panic lies with the Treasury Department of the United States. It has attempted to undermine confidence in the bimetallic system, and it has kindled a fire that it has not yet been able to extinguish.

Wages on the Comstock.

The miners on the Comstock have practically decided to resist the proposed 25 per cent reduction in wages, and have framed a reply to the document submitted early in August by the mining presidents. Further conferences will probably be held, but the outlook now seems to be that no amicable conclusion will be reached.

The contention of the miners is that wages cut but a small figure in the total cost of mine operations, and that the effort to reduce expenses should more properly begin with the office force. They point out that large salaries are paid to officials, the functions of some of whom seem to be ornamental more than useful. Figures have been collated which make a very interesting showing: The total expense of thirty-one mines for June, 1893, was $194,571.60, of which $43,960—less than twenty-five per cent—was paid out for miners' wages. The salaries of presidents, secretaries and superintendents show a total of $16,680. It is claimed that this item has been materially reduced since August 1st, but previous to that time some of the officials held places in four or five mines, and thus secured salaries amounting to from $650 to $825 a month. The miners get $4 a day.

In the Alpha one miner was employed half of June at a cost of $60. But there were a president at $150, a secretary at $150 and a superintendent at $75. It took $300 in office salaries to keep one miner going in the Confidence. Overman paid a superintendent $300, a president $150, a secretary $200 and an assistant secretary $50 to keep eight miners at work.

At Alta not a pick was handled by a miner, but a president got $125, a secretary $250, a superintendent $300, and $50 was paid out in office rent, while the total expenses were $3475. And so on. The list might be extended at length.

A certain number of officials is necessary, and they are entitled to and earn good salaries. But, when the pruning knife is to be applied to the salary list, all employes should share alike. The effort at retrenchment should not be confined to miners' wages alone.

It is interesting to know just how lucrative Comstock shares have been to stockholders in recent years. The official showing of a number of mines, according to sworn reports, for the three-fourths year ending Sept. 30, 1892, was as follows:

Company.	Gross Yield.	Expenses.
Belcher	$63,032 71	$67,801 32
Challar	9,615 00	26,854 69
Challenge	11,286 03	28,954 46
Confidence	11,099 16	28,947 06
Con. Imperial	14,619 52	43,269 12
Con. Cal. & Va	639,444 67	692,113 27
Hale & Norcross	88,619 47	162,073 89
Kentuck	4,102 35	8,010 35
Overman	68.870 94	81,274 99
Occidental	44,861 00	46,844 00
Potosi	179,258 92	180,766 12
Savage	329,963 87	342,171 68
Yellow Jacket	79,689 61	150,197 44
Totals	$1,660,923 66	$1,869,183 69

These figures are instructive. They show that, in some instances at least, the year 1892, with moderate economy, might have been one of genuine, not Irish, dividends. They may suggest, also, that retrenchment all along the line will be necessary before the Comstock can be supported on some other than the assessment plan.

IN contrast to the general stagnation of trade and the paralysis of nearly all lines of production the activity in the gold mines of California stands out in striking relief. Wheat is lower than ever before. The fruit season has been without profit, and, in some instances, losses have been considerable. The wool market is completely demoralized. Hops are inactive, though prices, owing to large shortage in the foreign output, are nominally fair. Barley and all grains are very cheap. Lumber and coal are at a very low ebb. The iron industry is paralyzed. There is heavy overproduction of cotton, and the market is glutted. Silver, copper and lead have gone down together. And the list might be extended indefinitely. Overproduction has been responsible for the situation in part only. The war on silver, the panic, hostile legislation, or the fear of it, and general loss of business confidence have done the rest. In the midst of the great cataclysm of failures and depression the gold industry has stood like a rock. The shutting down of silver mines in some localities will restrict the incidental gold output there, but the development of gold mines has been going forward on a larger scale in California and in other gold-producing sections than for years. The output in this State for 1893 will considerably exceed the record of 1892, when it was $12,500,000.

THE State of Nevada has no reason to take a cheerless view of the future. The silver industry is not dead. Silver is a natural money metal, whose continued use in very large volume is certain. There is an apparently invincible disposition on the part of the controlling powers in legislation, backed by a misguided and exaggerated sentiment among Eastern people that silver is responsible for all the present financial evils, to stop its further coinage; but the reaction is certain to come. If not free coinage, then bimetallism will ultimately be the policy of the country. There must, sooner or later, be a revival of silver production. Besides, Nevada's mineral resources are by no means confined to the white metal. There are tin, copper, lead, antimony and nickel in large quantities. Iron and aluminium are constituent elements of the everlasting hills, or some of them. Gypsum and borax are already heavily produced. And the gold mines are capable of such development as to bring a large income into the State. All this is outside of the fine agricultural resources of Nevada. Pending the revival of silver mining, they can and will be developed. Nevada is all right.

One More Black Sand Invention.

A local inventor, whose name is as yet unheralded to fame, has secured letters patent for a new process of extracting gold from black sand, and the somawhat threadbare statement is made in connection with the invention that the problem of working black sand profitably has at last been found. The process is thus described in a daily paper:

Briefly told, his method of extracting gold from black sand has not been to destroy the iron, magnesium, etc., but merely to set the gold free and otherwise leave the sand intact. The plants consists of a cylinder 42 inches long and 22 inches in diameter, with a manhole in the side. The sand is put in at the manhole and the water is added. To the mixture certain chemicals are then added, combined in a manner which is the secret of the method. The cylinder is put in motion and simultaneously an electric current of 50 amperes and 6 volts is turned into the cylinder contents, much as an electrolising bath. After 20 minutes' revolution the manhole is opened, the sand is dumped into a hopper and passes on to a concentrator and amalgamator. The gold unites with the quicksilver of the amalgamator and is then scraped off and retorted, the sand having been washed away by the stream of water which passes over the inclined and gently shaking amalgamator. The theory is that the chemicals and electric current act on the gold alone.

The first sentence sounds familiar, but there are some features of the appliance that are really novel, though the description is in places a little vague. The inventor, we are informed, has spent some years of study and experiment and $10,000 in cash on his process. It has now been in operation three months, it is said, and it handles, with two men, ten tons of sand a day, at a cost of $1 per ton, and a profit of $5 to $10 per ton. Incidentally, a cheap method of extracting ore from sulphurets has been found.

It is to be regretted that the inventor deems it in conflict with his financial interest to disclose to the general public the secret of his wonderful chemical compound. There are incalculable quantities of black sand between San Diego and Alaska, all of which the inventor can hardly hope to cover himself and which might be worked profitably by others without disadvantage to him. But, of course, he knows his own business.

There have been processes and processes and processes of working black sand, and we are constrained to withhold final judgment on this latest method until we know a little more about it.

It may work, but a long line of failures in the same field of invention precedes it.

The Cruiser Olympia.

There is good reason to anticipate that the new cruiser Olympia, whose "dock" trials have been taking place the past two weeks, will be not only the fastest vessel turned out by the Union Iron Works, but the swiftest in the United States Navy. The Olympia has already exceeded twenty knots under circumstances that indicate she will beat twenty-one knots, the best record of the cruiser New York on her official trial trip, three months since. The unofficial tests of the Olympia have all been in San Francisco harbor, and when going at full speed, or nearly full, the vessel invariably sucked bottom. There should be one fathom of water for every foot of draught, and for that reason Santa Barbara channel is chosen for all official tests on this coast. When the Olympia was in less than fifteen fathoms, drawing twenty-one feet and making sixteen to seventeen knots, she would pull a big swell around her and squat down like a river-boat, with only a foot or two of water under her keel. At that depth she would stir up mud at the bottom; and she would drag the swell astern of her. She was sluggish and took notions all the time to run off. It took 25 deg. of the helm to hold her to her course, but when she got into twenty fathoms 3 deg. held her easily and she turned beautifully with 10 degrees of the helm. But when she struck twenty fathoms depth she steered like a pilot-boat and ran like a deerhound. All this time, her machinery ran as smoothly as a sewing machine.

The Olympia has four double-end boilers, weighing eighty tons each, and two single-end boilers. On these trips she did not use all her power and was blowing off steam most of the time. She turned as many as 132 revolutions a minute, while she will be able to turn 145 revolutions.

The official trial trip of the cruiser cannot take place for probably two months. The barbette armor is now being placed in position and then her upper deck will be laid. Much joiner work remains to be done. Her machinery will require very little attention. The bearings are already smooth, almost to perfection. When she is finished, with her guns on board, she will draw twenty-four feet.

Altogether, the Union Iron Works have reason to be satisfied with the Olympia. She is a model of modern commerce destroyers. Her movement is swift and precise, her machinery perfect and her model admirable.

It is expected that the Senate will next week reach a vote on the repeal of the silver-purchase provision of the Sherman law. The Senate is considering the matter in a leisurely manner, and has declined to affix any limit to the debate. The silver men are well organized, and the vote will doubtless be close. Senator Stewart occupied a large part of Tuesday and Wednesday in advocating the cause of silver, and had not finished at this writing (Thursday). No plan of subsequent legislation has been agreed upon, provided the repeal bill passes; but there is no doubt that some bill assuming to recognize silver will be offered.

The recent controversy over the matter of tin-plate production seems to have been settled in favor of the home producer. There are now in the United States 35 active manufactories of tin and terne plate and tinning sheets. *Tin and Terne* has been collecting statistics of manufacture, and the returns from 31 factories for three months ending June 30th are as follows:

	Lighter than 68 pounds to 100 sq. ft.	63 pounds to 100 sq. ft. & heavier.
Tinned Plates	17,010,536	904,470
Terne Plates	15,286,447	355,507
	32,296,983	1,259,977
Estimated production of tin and terne plates of four firms making no returns	2,750,000	
Made from American black plates	15,667,219½	
Made from imported black plates	20,662,516⅔	

The total weight of all plates tinned, irrespective of weights per 100 square feet, is 36,306,960 pounds, nearly 45 per cent of which were from American black plates.

At the annual meeting of the Nevada County Miners' Association, August 31, the following officers for the coming year were elected: President, Alf. Tregidgo; vice-presidents, J. S. McBride, R. McMurray, E. Colaman, P. Camphell, J. S. Goodwin, N. C. Miller, Geo. Fletchar, H. C. Callahan, Niles Searls, J. G. Mather; secretary, W. F. Englebright; assistant secretary, I. J. Rolfe; treasurer, B. F. Snell; executive committee, A. Tregidgo, J. M. Walling, M. L Marsh, Geo. Fletcher, Fred Searls; finance committee, J. T. Morgan, Jos. Weissbein, C. R. Clarke, E. J. Rector.

The executive committee was empowered to appoint one delegate for every ten members, to attend the Annual State Convention to be held at San Francisco on the second Monday in October. Among other things done by the association, the Midwinter Fair was endorsed, and the administration of Hon. Robert McMurray as World's Fair Commissioner was commended.

It appears not to be mandatory that the Debris Commission shall, under the Caminetti Act, require the construction of restraining or other works as a condition precedent to the operation of hydraulic mines. Section 15 of the Caminetti Act provides:

No permission granted to a mine-owner or owners under this act shall take effect, so far as regards the working of a mine, until all impounding dams or other restraining works, *if any are prescribed by the order granting such permission*, have been completed, etc.

It seems to us that the commission will be acting entirely within its power if it allows the operation of mines without restraining or other works in cases where the navigable streams will not be interfered with and the rights of others will not be affected.

Tailings.

Denver proposes to bring into existence a party whose motto shall be free silver and free trade.

The day the Wilson bill passed the House the Butte *Inter Mountain* draped its columns in black.

The Plumas *National-Bulletin* has passed its twenty-eighth mile post. It is one of the best of our country exchanges.

At Forbestown it is impossible to get a bed for a single night, and a stranger going there must be prepared to furnish his own sleeping quarters, says the Palermo *Progress*.

It is reported in Grass Valley that the Harmony mine of Nevada City has been sold to Orrin Gowell, a San Francisco capitalist. The price said to have been paid is $15,000.

A gold bar valued at $15,000 has been shipped to the Carson Mint. The bar represents the product of 20 tons of ore extracted from the West mine in the Devil's Gate district, last month.

Encouraging reports continue to be received from the White Horse gold mines, near Wadsworth, Nevada, says the Winnemucca *Silver State*. The camp promises to develop into a great gold producer.

Articles of incorporation have been filed in San Francisco on behalf of the Grant Gold Mine Company, with a capital of $600,000. Directors—T. N. Machin, I. V. Hayes, Valentine G. Hush, S. R. Thorne, Henry L. Fox.

F. F. Coffin has resigned the superintendency of the mines formerly under his control, says the Winnemucca *Times-Review*, and will depart for California this week. R. M. Catlin succeeds Mr. Cashin as superintendent.

Four of the six smelters in Leadville district, Colorado, have shut down, and the fifth will soon follow suit. Leadville has already turned its attention to gold production, and placer mines will be developed on an extensive scale.

The famous Utica quartz mine at Angels, Calaveras county, owned by Alvinza Hayward, the Hobart estate and C. D. Lane, yielded last month the enormous amount of $165,000, which was $25,000 more than the owners expected. This is the biggest clean-up in the history of the mine.

Ten miners and two engineers were dropped last week from the Best & Belcher and Gould & Curry mines, leaving only one shift employed in underground explorations. Six men were also dropped from the Kentuck mine. The failure of the shareholders to pay their assessments is given as the cause.

The company formed to operate the Grand Victory mine near Hanks Exchange in El Dorado county is styled the New Grand Victory Mining Co. It is incorporated with a capital stock of $1,000,000, and the present directors are M. Thompson, W. C. Stratton, T. Clark, S. B. Clark and J. Gordon.

Prof. Geo. Davidson of the Coast and Geodetic Survey has notified the office in this city that he will return from the scene of his labors, near Lake Tahoe, on September 10th. Now that the work of fixing the eastern boundary of the State has been started, the presence of Prof. Davidson in the field is no longer necessary.

A mass meeting at Placerville last week endorsed the following resolution: "We are opposed to the repeal of what is known as the Sherman Act or any of its clauses or provisions in the present extraordinary session of Congress, unless a substitute providing for free coinage of silver, the product of American mines at a ratio of 16 to 1, shall take its place."

The stockholders of the Morning Star gravel mine of Iowa Hill, most of whom are Grass Valleyans, held their annual meeting last week and re-elected the old Board of Directors as follows: J. H. Neff, Frank S. Richards, Henry Disque, Edward Coleman and John C. Coleman. The Board organized by electing J. H. Neff president and superintendent; Frank S Richards, vice-president, and Henry Disqus, secretary and treasurer.

The Alma Gold-Mining Company has been incorporated for the purpose of developing the Mattley field claim near Jackson, Amador county. The capital stock of the company is $1,000,000, divided into 200,000 shares of $5 each. The directors of the company are: George B. Hazelton, president; J. N. Wells, vice-president; D. Gutman, secretary; W. B. Hamilton, H. H. Bodwell and J. B. Francis. Mr. Francis is superintendent.

Articles of incorporation of the Idaho and Eureka Northwest Extension Mining Co. have been filed with the clerk of Sacramento county. The principal place of business is to be Sacramento. The capital stock is $20,000, divided into 200,000 shares. The amount actually subscribed is $75,000. The directors are John F. Cooper, George F. Norss and A. C. Hinkson of Sacramento and E. B. Thomas and Perly Brown of Grass Valley.

The Eastern Star Gold and Silver Mining Co. has filed articles of incorporation with the Nevada county clerk. The company is incorporated with 100,000 shares of the par value of $10 per share. Sixty thousand shares have been subscribed. The company has claims on Rattlesnake creek, and it proposes to proceed at once with the development work. The directors are Frank E. Dennen, Elam Biggs, Geo. Vincent, P. H. Paynter and D. N. Coffin.

The Hancock Mining Company, whose property is located on the Mokelumne river, has been incorporated with 100,000 shares of stock at a par value of $1 per share. Following are the directors: Jackson Dennis, president; J. Nichols, secretary; W. D. Chambers, superintendent; John Brown and C. O. Mitchell. The Amador *Record* says: A water hoist is to be put in and the work of sinking a shaft 300 feet will be begun at once. The vein on the surface will average about six feet in width and will mill about $5 a ton. Thirty thousand shares of stock are owned in Amador City.

A large and important find of gold is reported in western Australia, in the land of the Hampton Railway Syndicate. So favorable was the showing made at the preliminary tests of the ore that the concern in question has converted nearly a third of its lease-hold of Australian lands, which amount to nearly a million and a half acres, into freehold. In some parts of the district the metal is found in large pieces absolutely free, no crushing being necessary. The fact that nearly all the gold-bearing land has already been gobbled by the syndicate, however, leaves little incentive for prospectors.

The old placer pioneers will watch with interest the progress of operations, in building the cut-off at the mouth of the Yuba river, says an exchange. The Yuba and Feather rivers were marvelously rich in gold dust in the early days, and pioneers who know that part of the country expect that some rich pockets and rich deposits will be found. The new mouth will leave dry a mile and a half of the Yuba at the present confluence of the Feather river. As soon as the waters are turned into the new channel, prospectors with shovels, pans and rockers will flock to the scene to try their luck.

Superintendent Daggett of the Mint has issued a few directions in regard to the handling of gold bullion. The gold must be sent to the Mint in such a manner that it can be easily inspected and receipted for. It cannot be shipped directly to the Mint. Bullion will not be taken for coinage in lots of less than $100 in value, nor will it be taken if not approximately pure. As soon as the gold can be assayed, which process requires about 24 hours, returns will be made upon it. Persons offering bullion need not, therefore, wait until their particular metal is coined. Returns, if in gold, will be paid at the Mint; if payment is accepted in silver, the Mint will send the returns, at its own risk, to any place desired.

The Mining and Scientific Press is in receipt of a new and enlarged edition of a work which is fully described in the title pages as follows: "The Mine Foreman's Handbook of Practical and Theoretical Information on the Opening, Ventilating and Working of Collieries." The volume contains questions and answers on practical and theoretical coal mining, designed to assist students and others in passing examinations for mine foremanships. The author is Robert Mauchline, ex-inspector of mines in Pennsylvania and superintendent of coal mines. He considers the subject in a plain and practical manner and places his experiences and theories before the reader in excellent style. Such subjects as mine gases, safety lamps and instruments, ventilation, maps, pillars, mine timber, dams, railroad tracks, switches, etc., etc., are discussed in detail. There are many things in the work of value to the quartz miner. The pages are embellished with 114 engravings. The price is $3.75, and the publishers are Henry Carey Baird & Co., industrial publishers, booksellers and importers, 810 Walnut street, Philadelphia.

The Debris Commission.

The Anti-Debris Association gave ample evidence of the tactics it intends to pursue with reference to the Caminetti law, at the session of the Debris Commission, Monday, Sept. 4th. At that time, the public hearings on the applications of N. C. Tully and the Eureka Lake & Yuba Canal Company for license to mine by the hydraulic method at a mine on Scotchman's creek, Washington Township (Omega mine), and at the Farrel mine, Columbia Hill, Nevada county, respectively, were appointed to be heard. It developed at the hearing that the various applications are to be contested by the anti-debris people before the commission, where there is possible ground for objection under former decisions of courts; and in other cases it is designed to have a representative on hand to "watch" things. When the several documents pertaining to the two applications had been read, Attorney R. T. Devlin, of the Anti-Debris Association, called attention to the fact that the Farrel mine had been enjoined from operation by order of the Superior Court and its owner, Mr. Bigelow, fined for violation of law. Mr. Devlin also claimed that the petitioners asked leave to mine temporarily with the old dam, which had, by order of the court, once been declared insufficient to impound the debris.

Attorney Searles, for the petitioner, stated that the dam had been improved and strengthened and was quite strong enough to hold debris to its full capacity.

Major Heuer here interrupted by moving that the application be granted. He stated that Col. Benyuard and himself had inspected the mine and the dam. It was evident that the two commissioners consider that the dam is sufficient for all present requirements. The motion was taken under advisement.

Mr. Devlin also submitted a statement by Messrs. Striedinger & Von Geldern, the civil engineers, reviewing the plans and specifications of the impounding dam and waste weir. Certain discrepancies between the petition and plans were pointed out, and the waste weir was declared inadequate, and the structure as a whole, too low, too weak and too steep. The papers were filed with others to be considered by the commission.

It was to the application of Mr. Tully that Attorney Devlin urged the most serious objection. He submitted a statement that Tully was not the owner of the mine, which had been sold by the United Ststes Marshal under execution to Edward Woodruff, of Marysville. Mr. Devlin's proof consisted simply of a copy of the record.

Attorney Searles called attention to the fact that Tully had sworn that he was owner of the mine, and, in absence of any other documents to the contrary, his statement should be accepted without question. He further volunteered to say that Mr. Tully claimed ownership to the mine by virtue of a sheriff's deed, and had been in undisturbed possession for some years.

Mr. Devlin insisted upon the validity of the marshal's deed.

Chairman Mendell said that it was not the business of the commission to settle question of title. The law imposed no such duty upon the commissioners. The verified petition of Mr. Tully was *prima facie* evidence that he owned the claim and he thought the commission was not obliged to go behind that.

Mr. Devlin spoke at some length on the question of title, but the commission insisted upon its position of non-interference. The proper place to settle such matters was in the courts. Mr. Devlin said that if the commission granted Mr. Tully a license, it would virtually attempt to decide the question, for it would assume that he owned the claim. It was suggested to Mr. Devlin that he should present his facts and proofs in writing, and a final determination on the application would be deferred a reasonable time for that purpose. He was also given plainly to understand that his objections would not influence the decision of the commission. Mr. Tully's continued, undisputed possession of the claim, and his sheriff's deed were sufficient evidence that he had a right to operate the mine.

Attorney Devlin also presented a statement by Engineers Striedinger & Von Geldern relative to the plans of the impounding dam. The plans were objected to on various grounds, mainly because they did not sufficiently indicate what it was proposed to do, and also that the large amount of brush and wood entering into the construction of the dam did not insure its permanency.

The public hearing was then ended..

THE Senate Committee on public lands has favorably reported a bill granting to the State of California five per cent of the net proceeds of the cash sales of public lands in the State which have been made since the State was admitted, or may hereafter be made to aid in the support of public schools.

What Is a Proper Location?

The Supreme Court of Nevada has just decided a case of interest to mining men. Its title is J. Ponjade *et al.*, plaintiffs and appellants, *vs.* Pat Ryan *et al.*, defendants and respondents. The facts of the case are as follows:

The ground in dispute is situate in the Pennsylvania mining district, about 45 miles southeast of Pioche, and was formerly known as the Klingensmith mine, upon which the assessment work was not done in 1888, and early on the morning of Jan. 1, 1889, the defendants, Pat and James Ryan, located the ground as the Hope mine, and shortly after, the plaintiffs, J. Poujade and Chas. Roeden, located the same ground. The defendents refused to give up the claim, and plaintiffs brought suit, the main point in which was the validity of the Hope location. The case was tried before Judge Talhot, who gave judgment for the defendants. The plaintiffs moved for a new trial and Judge Talbot denied the motion, and plaintiffs appealed to the Supreme Court, and this decision is the result. It was rendered hy Judge Bigelow, Judge Murphy concurring. After finding against appellants relative to construction of the local statutes as to manner of appeal and jurisdiction of the court, the decision is:

The only other error assigned is that upon the admission in evidence of the notice of location of the defendants' mine. Upon this point the statement contains the following:

James Ryan, nne of the defendants swnrn nn hehalf nf defendants, testified substantially as follows: * * The nntice nf lncatinn nf the Hope mine is shnwn the witness, and he says: 'This is a duplicate nf the nntice we pnsted. We pnsted nurs nn a mnnument nn the claim, and had this nne recnrded.' * * Defendants here nffered in evidence a recnrded duplicate of the nntice nf locatinn nf the Hnpe mine, to which plaintiffs objected nn the grnund that it was insufficient, irrelevant, incnmpetent and immaterial, in that, being a recnrded notice, it is insufficient fnr lack of descriptinn, and that it dnes nnt identify the claim hy reference to a permanent mnnument or natural nbject.

We know of no law requiring a notice of location to contain a reference to a permanent monument or natural object. It is the record of the location that must contain this reference, and only then when the district laws require such record to be made.

There was no evidence offered concerning the local laws of this district, nor, indeed, does the recorded notice seem to have been offered for the purpose of proving compliance with any rule requiring recordation, but rather as the notice which was posted upon the mine as a part of the location thereof. As such, there was no error in admitting it. Without proof of a law requiring recordation, the fact that it had heen recorded made it no better nor worse than if it had not.

The appellants assert that it is a universal custom, applicahle to all mining districts, to require the recordation of mining locations, and, as we understand the argument, that we should consequently take judicial notice of its existence. We are of the opinion, however, that it has heen too often decided that the existence of rules and customs governing the manner of locating and holding claims in each district is to he established by the evidence in the case the same as any other question of fact to he now open to controversy.

The order appealed from ls affirmed.

The Derbec Drift Gravel Mine.

Samuel Butler, in course of an excellent article on the North Bloomfield mines, in the *Foothill Weekly Tidings*, thus explains the working methods of one of the leading drift gravel mines of the State: "The Derbec drift gravel mine is a consolidation of several claims and is now owned hy the Derhec Blue Gravel Mining Company, incorporated in 1877. This mine, which is situated one mile northwest from the town of Bloomfield, covers an extent of 621 acres. The mine is worked from a shaft having a vertical depth of 460 feet. The gravel, which is not cemented, is extracted to a depth of 10 to 11 feet. It is washed in slnices and has yielded on an average of $1.85 per carload of 1500 pounds, or $2.47 per ton, this heing the average for 11 years. The daily extraction is 270 carloads, equal to 200 tons.

"The first washing is through 600 feet of flume, the tailings heing retained in a creek hed by a hrush dam in order that they may "slack." This heing done, the dam is cut and the accumulated mass is ground-sluiced into a flume 4000 feet in length, adding 10 per cent to the total yield of the 600 feet of flume. The width of the pay channel at the present time is from 600 to 700 feet. It has heen found as small as 175 feet at some points. It has heen worked up the stream a distance of 3500 feet in a straight line from the shaft. Mules are used for transporting cars, timhers, etc., to the hreast of the tunnel. There are ahout 10 miners' inches of water in the mine, which is drained through a tunnel driven for the purpose and which drains the whole mine. The hoisting works contain a 40-horse power steam engine with two hoilers, and are well arranged and equipped. Flat cahles are used and the shaft is supplied with a douhle track. Safety cages are employed and the shaft remains covered hy a honnet until the cage comes up, and in this way accidents are avoided. Over $50,000 was expended in this mine before pay gravel was struck. Over 100 men are employed, with wages from $2.50 per day to $3. As soon as hydraulicking begins the Derhec Company will begin operations under that process. This mine has produced $2,880,000 during the present working."

Late Mining Decisions.

Following are recent decisions of the courts in mining cases:

When Examination of Party Before Action is Proper.—Where there is a doubt as to who were owners or operators of a mine at the time of an accident therein when decedent was killed, decedent's adminlstratrix is entitled to an examination of the superintendent of the mine before hringing an action for the death of decedent to ascertain such fact. *In re* Nolan, Supreme Court of New York, 24 N. Y., Supp. 238.

Right to Select Mineral Lands as Homestead.—Mineral lands of the United States which have heen located and used chiefly as a placer mining claim, though also used by the owner as a residence for himself and family, and to some extent for pasturing stock and raising vegetahles, may be selected, under the State laws, as a homestead; and the fact that such lands are reserved hy Acts of Congress from entry and sale, except as mining claims, and that title to them cannot he acquired hy pre-emption or homestead entry, is immaterial in a contest hetween a homestead claimant and his creditors, since, as between them, the title to the land claimed as a homestead is immaterial. The fact that the statute exempts from execution the dwelling of a mloer, not exceeding in value $500, and also his mining claim actually worked hy him, not exceeding $1000, does not preclude the right to select the dwelling and claim as a homestead. Gaylord vs. Blace, Supreme Court of California, 33 Pac. Rep. 484.

Rights of Locators of Tunnel Claims.—Where one duly located a tunnel under the Revised Statutes U. S., Sec. 2323, and discovers a mineral lode in the tunnel, he is not hound to make another discovery and location of the lode from the surface in order to he protected against a suhsequent surface location of the same lode. The above statute provides that the owner of a tunnel for the discovery of mines shall he entitled to the veins or lodes discovered in the tunnel to the same extent as if discovered from the surface. Sec. 2320 provides that a mining claim located after May 10, 1872, may equal hut shall not exceed 1500 feet along the vein or lode. Where one locates a tunnel and discovers a lode, he may claim 750 feet of the lode each way from the point of discovery. Ellet vs. Camphell, Supreme Conrt of Colorado, 33 Pac. Rep. 521.

Liability for Injury to Servant by Dangerous Premises.—A miner may recover for iojuries sustained hy the falling of a stone from the roof of the mine, although he knew the roof was llahle to fall in when he told the foreman of the mine of the danger, and the latter promised to have the roof propped; the miner having continued in the employment from day to day in reliance on such promise, and having been injured while about to quit work hecause of the neglect to prop. Breckenridge Co. vs. Hicks, Court of Appeals of Kentucky, 22 S. W. Rep. 554.

The Anti-Debris Association.

At the recent annual meeting of the Anti-Dehris Association, at Yuha City, it was decided to continue the organization for at least another year, as there is still some unfinished husiness to attend to. An address hy President C. E. Stone was read, in whlch he said in part:

I am of opinion that the [Dehris] Commission should not be interfered with hy either the miners or the valley residents, and that should a delegate from this association be present it should only he for the purpose of giving information as to previous conditions, should the Commissioners desire such information.

The U. S. Government now having charge of hydraulic mining, we should allow the Government Commissioners to conduct their operations in their own way, as we know they are entirely independent and interested only in the preservation of rivers and harhors.

After obtaining a license to mine many of the miners will he disposed to exceed the limits as to deposits of material, and it will be in order for our association to send out watchmen to ohtain evidence, that the Commission might be notified as soon as their rules were violated, that proceedings may he had in the courts at the earliest moment.

To Prevent Overwinding.

Ockwell Hawkins, one of the managers of the Treharris Colliery, England, has patented an invention for preventing the cages of a pit from falling should the rope snap or slip off the sheave while they are being lowered or raised. The device is simple in its construction. The apparatus is riveted to the side of the top part of the frame of the cage, extending from corner to corner, at each of which is the appliance for gripping the two iron or steel guides running from the top to the hottom of the shaft when the rope hreaks or becomes detached while the machinery is workIng. The appliance forms no impediment whatever, and can he fixed in a very short time to the cage of any pit. The greater the weight of the cage and its load, the greater or firmer is the grip of the appliance. The cost of the appliance ls very small, for lt is made of iron and contains no delicate mechanism in any part of it.

Lowest Cost of Mining and Milling.

TO THE EDITOR:--If you have the data at haod, I will esteem it a great favor if you will let me know how cheaply ore can he extracted and milled under the most favorahle conditions, citing lnstances. L. L. MYERS,
Supt. S. V. G. Co.

Cherokee, Butte Co., Cal, Aug. 21, 1893.

The query of our correspondent opens up a very interesting suhject, to which some research has heen devoted in securing a satisfactory answer. The Treadwell mine in Alaska probahly secures hetter results from low-grade ore than any other large mine in the world. The Treadwell is practically an open qnarry. The report of the Alaska-Treadwell Company for the year ending May 1, 1893, shows that the quantlty of ore crushed was 237,235 tons, ylelding an average of $2.13 cents in free gold. There were 4276 tons of sulphurets saved hy concentration and 4584 tons treated, giving an average of $41.28 per ton. The average for all the ore treated, lncluding yield from sulphurets, was $2.94 cents per ton.

The cost of work last year is given very fully ln the report. Mining (237,235 tons), cost for lahor, 39 60 cents; supplies, 20.74 cents; total, 60.34 cents per ton. Milling (237,235 tons), cost for lahor, 18.37 cents; supplies, 25 60 cents; total, 43.97 cents per ton. Chlorinating concentrates (4584 tons), cost for lahor, $5.3432; supplies, $3.649; total, $8.9922 per ton. Averaging all costs on the ore mlned, the result was: Mlnlng, $0.60; milling and concentrating, $0.44; chlorlnation, $0.17; general expenses at mine, $0.07; San Francisco office, $0.02; hullion charges (freight, insurance, etc.), $0.05; total, $1.35 per ton.

Prohahly the cheapest milling of ore ever accomplished ln the world was hy the use of a roller mill at the Spanish mine, Washington township, Nevada county, Cal., four or five years ago. The circumstances were exceptional, hut the results show what may he accomplished under similar conditions.

At this mine the vein averages 90 feet. The hanging wall is a slate, soft, shaly and not well defined. The true vein ls on the footwall and consists of solid quartz, four feet thick. It does not pay for working. The pay is found on the hanging-wall side, which contains many veinlets and streaks of ferruginous quartz carrying gold. Where no quartz is to he found there is no pay. The slate on this, the west, side is talcose.

The main tunnel was ln 1200 feet. The vertical distance from the surface to the end of the main tunnel was 350 feet. One of the methods of extracting ore here was as follows: There was an excavation from the tunnel to the surface which acquired the form of an open cut with sloping sides, too steep for a man to stand on; a Chinaman, armed with a churn drill, was lowered by a rope; he drilled a hole which, when deep enongh, was charged with ahout five pounds of powder and fired, causing a large quantity of the soft slate to slide to the bottom, whence it was taken out throngh the tunnel. The mine employed a foreman, two white men, and eight Chinamen, who extracted ahout 4000 tons of ore a month, enough to keep the mill at work. The wages paid were: White men, $3 per day; foreman, $3.50, and Chinamen, $1.50 per day.

The ore obtained came out of the tunnel hy gravity, the empty cars heing hauled back by mules. The ore was passed through a Blake rock hreaker and then ground in a Huntington roller mill, of which there were three of five feet diameter and one of four feet. The mills, whlch made 58 revolutions per minute, were fed hy Hendy automatic ore-feeders.

The following record of one month's run of the mine may he taken to indicate the low cost of working the ore, and to show also how very low grade an ore may he profitably treated when the conditions are all favorahle:

MINE—COST OF PRODUCTION.

[Run: 28 days' work produced 3443 tons of ore.]

	Labor.	Supplies.	Total.
Extracting ore	$703.50	$113.41	$816 91
Delivering ore to mill	160.20	17.95	171.15
Dead work	105.20	10.93	116.13
General expense	78.35	1.95	80.30
Total	$1.047 25	$144.24	$1,191.49
Cost per ton	.304	.042	.346

MILL—COST OF REDUCTION.

[Run: 24½ days reduced 3443 tons of ore.]

Mill expenses	$227.32	$194.33	$421.65
Water for power	.....	161.70	161.70
Handling ore	154.50	5.35	159.85
General expense	78.40	1.95	80.35
Total	$460.22	$363.33	$823.55
Cost per ton	.133	.106	.239
Bullion produced	.....	.....	$3.138.55
Total expenses	.....	.....	2,015.04
Profit			$1,123.51

It will he seen from this that the ore only yielded a trifle over 91 cents per ton, yet a profit of 32.6 cents per ton resulted. The percentage of profit was 35.8 of the total. In the previous month 2796 tons of ore were worked, whlch yielded $1.16 per ton. The profit was 56 cents per ton, or ahout 48 per cent of the total. The prcfit that month on a yield of $3,268.49 was 1,572.91. The cost of mining was 37½ cents and of milling 23 cents per ton.

The Mines of Siskiyou County.

With the late renewed attention to gold mining in California, there ls an excellent prospect that the mines of Siskiyou county will contrihute even a larger share of the gold ou'put of the State. Siskiyou has earned a record for steady production not surpassed hy many other counties, and it is destined to occupy even a more important position in the industry. It is doubtful if the mines have ever heen in hetter condition or if the outlook was ever more encouraging than at present. The Yreka *Journal* of late date contains a review of the mining industry in Siskiyou county, from which the following is taken:

The Klamath river, with its trihutary streams, Shasta, Scott and Salmon rivers, furnish the main hullion-producing sections of our county. From all these come the most flattering reports of the gold yield of the present season. The gravel banks on the Klamath for its entire length in this county, or to where it reaches the upper edge of the gold helt, has paid splendidly.

The Heald mine, whlch has heen successfnlly worked for the past 25 years, is still worked with good results.

The company of Chinamen working Dillon's have realized for the season's run $15,000.

The Elliott Brothers at Cottage grove are running their mine with good success.

Ock & Co.'s mine, located at Happy Camp, has yielded this season (with a small head of water) upwards of $20,000.

While not heing ahle to give the yield of the Muck-a-Muck mine, the sum is known to he greater than in former years.

Higher up the river the Gordon and Reeves mines are paying well.

At Thompson creek the Shiner Brothers are working successfully with hut a limited supply of water, while at Sciad, the famous Fort Goff mine is now one of the steadiest and hest paying claims on the river.

At Portuguese Bar, the Girder mine and Captain Jack Lowden's mine are heing worked to advantage.

There are hut few of the mines on the Klamath that are not paying handsome returns under the improved system of mining. From Cottonwood to where it leaves our county, something over 100 miles, the ground is being worked almost the entire distance, with still numerous hanks of gravel or former channels of the river inviting capital.

Rich as has heen the yield of this famous stream, it does not surpass that of other sections of the county.

The Montezuma and Messner mines, located at the head of Scott river, in the South Fork mining district, have yielded to their owners for the present season's run over $20,000, with work still heing prosecuted.

Eastick Bros.' mine, in the Oro Fino mining district, with a run of 41 days, during a portion of whlch time hut one giant was used, yielded $15,460, while Wright & Fletcher's mine adjoining is glving good returns for the amount of bedrock cleaned. Experienced miners say that these mines never looked better than at the present time.

On the opposite side of the ridge, in the Quartz Valley mining district, the R. H. Campbell Gold Mining Company are making this season one of the most successful runs ever made in this celebrated mine. It is estimated that the company will realize upward of 25,000, with the main portion of the paying ground yet to he opened.

In the Salmon River district the gold yield will surpass that of last season, which will prove it to be one of the best mining sections in our State. Not only have the mines in active operation made heavy hullion shipments, but new and extensive enterprises are heing started in nearly every locality, which will no donht pay handsome returns in the near future. The trouhle has been thus far in onr county that many of our finest mines have heen located and are now being held hy men who have no means to work them, consequently they have remained undeveloped. But this is fast changing now, and men of means are opening up some of these heretofore dead properties.

Alex Parker & Sons, of Etna, have spent some $15,000 in hringing on water and fitting up the Red Hill placer mine on Salmon. So well pleased were they after two short runs that they at once commenced the work of hringing on the second ditch, and will in the end no doubt make it one of the hest-paying mines on the Salmon.

A company is now talking of opening up the old hack channel of Scott river, in the South Fork mining district, for the purpose of making a hydraulic propositlon out of it.

This channel reaches from near the old A B C claim, oo Fox creek, down the river for a distance of nearly four miles. It is some 80 feet ahove and ahout the same distance back from the present river bed. At different points it has heen drifted into and good prospects found. Now that the main river bed has been worked, thus furnishing an unlimited dump, this is a practicahle plan of working this ground from which enormous yields will be made for years.

On Humbug creek, which paid so well in olden times, numerous rich quartz mines are now being opened and worked with success; also at the Schroeder & Werner group of mines at the head of the East Fork of the Deadwood, which fed the East Fork.

Can anyone doubt for a single moment, upon investigation, that the ledges which cross Scott river, a short distance ahove the town of Scott Bar, must have made this mining camp (one of the richest ever found in the State) what it is?

Here are five or more parallel veins, varying in thickness from two to five feet, crossing Scott river in a northeasterly and sonthwesterly direction, dipping easterly. They are commonly known as Quartz Hill, for the wearing away of the soil by the action of the water has left a mountain of quartz exposed to view. Originally these were many hundred feet higher than at the present time, and Scott river cutting through them at this point gradually wore away the quartz and deposited the gold in the channel of the stream helow. Ahove this point no gold is found in paying quantities. Below is one of the richest mining sections in California. Quartz Hill is now owned and heing worked hy the Scott Bar Mill and Mining Company. The mine has for a number of years heen worked hy former owners as a hydraulic claim, with good results, hut it has heen the intention of this company to sink shafts and drive lateral drifts into these veins of quartz. Should this he done, and a suitahle mill constructed capahle of crushing from 100 to 200 tons of quartz daily, we would yet see Quartz Hill one of her greatest mines. Although with the old system of hydraulicking they still make fine returns from the surface of these veins as deep down as they have ever worked them, yet it cannot he long hefore enterprise and capital will open this mine and make it yield up its store of hidden wealth.

Various Processes of Ore Reduction.

An account of different processes for the treatmeot of ores has not hefore heen presented to our readers at one time. A statement of several of different methods, part of which are used in California, others in South Africa and elsewhere, will give an opportunity for comparison, and may perhaps lead to judgment as to which is the hest. Omitting the cyanide process, we condense from London *Machinery* a careful and exact article on the subject:

Plattner's Process.—The ore is first roasted to effect the elimination of the sulphur, antimony and arsenic. The roasted ore is then put in a vat, and chlorine gas, which is made in a separate compartment, is passed into it. The gas transforms the gold in the ore into a chloride, which is then dissolved in water and carried out of the ore hy filtration into precipitating tanks, to which some precipitant is added. The metal is then collected from the hottom of the vats, whence it has fallen as a finely divided powder. Of all the chlorination—or, indeed, any other—processes, Plattner's ls prohably even now the most generally used. In the important mining districts of California and New Zealand there are chlorination works, the average charge of which for treatment is $20.20 per ton of concentrates, 90 to 92 per cent of the assay value heing guaranteed. The cost of a chlorination plant, with a capacity of six tons per 24 hours, ls estimated at from $6000 to $7000.

Newbery-Vautin.—The Newhery-Vautin process is Plattner's, plus an air pump. This patent claims to treat the concentrates with chlorine, or other equivalent reagent, in the form of gas or in solution, applied under a pressure greater than that of atmospheric air. An air force-pump is used, which communicates with the harrel containing the ore. The concentrates are agitated hy rotation, and, after being subjected to the action of the chlorine for a sufficient time, are passed into a filtering vessel. The solution is drawn through the filter hy means of a suction pump. From the suction pump the solution is discharged into a vat, through which air or steam is passed, and then through a filter consisting of alternate layers of rough and fine charcoal. The solution rapidly decomposes on the charcoal, and the gold is readily ohtained. The Newhery-Vautin process has not made much way on the Transvaal gold fields, hut it is not yet demonstrated that it is not perfectly feasihle.

The Pollak.—This is another chlorination process, in which variations from the original type supplied hy Plattner are all directed toward ohtaining the maximum of pressure in the vessel containing the ore. In the Pollak process this is developed by hydraulic means. The ore is first roasted to expel the sulphur, and is then placed in a cylinder with a lead lining. Bleaching powder and acid, or bleaching powder and acid sulphate ot soda, for the liberation of chlorine, are then placed in the cylinder and water is admitted under pressure until the pressure within the cylinder reaches 100 pounds to the square inch. The cylinder ls rotated to from half an hour to an hour, and the gold is then found to have dissolved, the pressure having forced the chlorinating fluid into the pores of the ore. This is all that is distinctive ln the process, the remaining stages of the treatment heing more or less common to all the other chlorinating methods. The Pollak has done hut little actual work on the South African fields so far, hut a plant was erected at the May Consolidated, where operations have heen conducted.

The Hungarian.—This is a process which has heen at work for many years on the Hungarian gold mines. In this process the roasting is finished hy an addition of salt to the hot charge, in order to effect a chloridizing roast. The roasted pulp is then treated with a solution of hyposulphite of lime for the solution of the gold. It is claimed that it is as effective as any of the other processes, and that the cost is very considerably cheaper, hy reason of the saving effected in the chemicals. A small plant was erected on the Robinson mine, ln the Transvaal, some time back, and the results are said to have been in every way satisfactory. A larger plant has since been erected by the Ore Reduction and Smelting Company at Driefontein. The company has not attempted to work on royalty, but has hitherto confined itself to purchasing tailings and treating them. The company has also introduced the amalgamation by bichlorlde of mercury, which is a soluble salt of mercury, and a pattern of concentrating tables—some of which are at work at the Robinson—from which it is claimed better results are obtained than from the ordinary Frue vanners.

Adair-Cruickshank.—It is now hardly an open question that pyritous ore is for the most part not refractory—that is

to say, that there is no actual chemical union between the pyrites and the gold. Under a sufficiently powerful microscope, the section planes of the pyrites, and the line of demarcation between it and the gold, can be plainly discerned, and it follows that, by dividing the ore finely enough, no difficulty is presented to amalgamation in the ordinary way. The Adair-Cruickshank process merely consists in grinding the ore by an ingenious arrangement of rollers into an impalpable powder, and then amalgamating. There can be no doubt that in the majority of cases this process is perfectly effectual, but the objections appear to be that for driving the machine, power and skilled labor are required, and that gold can only be recovered in certain of its combinations. So far, however, no difficulty in recovering has been experienced, aod the question resolves itself wholly into one of cost. Under favorable conditions, in which some cheap form of motive power is available, it is probable that the Adair-Cruickshank would be exceedingly inexpensive.

Molloy's Patent.—The hydrogen amalgam process, which has been patented by Mr. B. J. Molloy, M. P., is a method by which the mercury is kept alive and "quick," and a constant contact is maintained between each separate particle of gold and the effective mercury. The apparatus consists of a shallow pan about one inch in depth and 3½ feet in diameter, containing mercury about half an inch in depth. In the center of the pan is a porous jar, so fixed that the mercury cannot enter or move it. Within the jar is a cylinder of lead and a solution of sulphate of soda. The cylinder is connected with the positive pole of a small dynamo, and the mercury with the negative pole, and when the current passes, decomposition of the electrolyte, formed by the solution of soda, sets in, oxygen being evolved from the surface of the lead and hydrogen from the mercury. The mercury combines with a portion of the hydrogen, and so forms a hydrogen amalgam, while the excess of hydrogen so formed passes away. While the mercury is charged with hydrogen it cannot oxidize, because of the presence of an excess of hydrogen, and the mercury is thus kept quick and always capable of absorbing the gold into itself. The pulverized ore is brought into contact with the active mercury by means of a revolving disc in the pan, which is just large enough to leave a narrow channel of mercury uncovered. The pulverized ore as it leaves the stamps flows into the hopper accompanied by a stream of water, and is carried under the revolving disc by centrifugal action, and is then rolled round the mercury until it reaches the outer channel between the edge of the disc of the pan. Then, when it is freed from the pressure of the disc, the ore floats over the edge of the pan, and passes away, leaving in the mercury all the amalgamable gold. This perfect extraction is due to the rolling action, which separates each particle of ore, and rolls it for some ten seconds in the quick mercury. The increased quantity of gold extracted by this process is said to be never less than ten per cent, and it is claimed that the whole cost of treatment amounts to only 8 cents per ton, for electrical and mechanical force, and for labor. Excellent results are said to have been obtained on a small scale from the Selati gold fields, and the process is now at work at the Wemmer, in conjunction with the Adair-Cruickshank process.

Accident Insurance for Miners.

The Lehigh & Wilkes-Barre Coal Co. has just made a proposition to its employes, whereby they or their families will be protected in case of accident or death, says the *Coal Trade Journal*. Notices have been issued to the employes stating that the largest capitalized accident insurance company in the United States has presented a plan for insuring all the coal company's employes at a nominal cost per month, and the workmen are urged to accept the proposition. Some of the company's employes carry accident insurance, and it is for this reason, the officials say, that they urge every employe to acquiesce to the adoption of the new scheme. The cost of the insurance to the employes will be as follows: Employes receiving $25 per month, 50 cents per month; employes receiving $30 per month, 60 cents per month; employes receiving $35 per month, 70 cents per month; employes receiving $40 per month, 80 cents per month. Those receiving other wages will be assessed in like proportion.

If the plan is accepted, the coal company will at once pay the full premium of every policy, deducting a small amount every pay day until the full amount has been refunded—that is, the coal company will advance the whole premium for the entire year, but the employes' share of the premium will only be deducted each pay day. The plan is not made compulsory, but is left to the intelligence of the employes. The benefits to each employe will be as follows:

(A.) If accidentally injured while at work, at home, on the streets, on the railroads, or elsewhere, you can draw one-half of your wages each pay day during total disablement for a period of 50 weeks, the company furnishing medical attendance free.

(B.) For the loss of sight of one eye; loss of one hand or one foot, by actual separation, you will receive one-quarter of one year's wages, the company furnishing medical attendance free.

(C.) For the loss of sight of both eyes, or loss, by actual separation, of both hands or both feet, or one hand and one foot, or the loss of one hand or one foot, each accompanied by the loss of sight of one eye, you will receive one-half of one year's wages, the company furnishing medical attendance free.

D.) If death results from an injury within three months of date of accident, you will receive one-half of one year's wages, the company furnishing medical attendance free and funeral expenses.

South African Gold Output.

The activity of the mines in Witwatersrand, South Africa, shows no diminution; but, on the cootrary, the output of the district is steadily increasing. It is now clear that the record for 1893 will be somewhere in the neighborhood of £5,500,000 sterling, exceeding the estimates of experts. The July output has beaten the record with 126,169 ounces, against 122,907 for June and 116,911 for May. We have not received the figures in detail for the July output, but for June they are as follows: 122,907 ounces, 8 dwts.; value, £432,163.

The cyanide process is a very important factor in the prosperity of the Witwatersrand mines. Its use in the district is controlled by the African Gold Recovery Company, Ltd., which works a large number of mines by the process. Some old tailings are being worked over. A statement of June results by the cyanide process is appended:

AFRICAN GOLD RECOVERY CO., LIMITED.

June Production.

	Ozs.	Dwt.
Crown Reef G. M. Co., Ltd.	1,839	14
New Rulfontein Est. G. Mines, Ltd.	1,323	10
Nigel G. M. Co., Ltd. (tailings)	2,394	5
Nigel G. M. Co., Ltd. (concentrates)	571	2
Meyer & Charlton G. M. Co., Ltd.	691	10
Salisbury G. M. Co., Ltd.	661	11
Robinson G. M. Co., Ltd.	1,458	14
Ferreira G. M. Co., Ltd.	883	2
Langlaagte Est. & G. M. Co., Ltd.	948	2
Langlaagte Est. & G. M. Co. (concentrates)	686	13
New Primrose G. M. Co., Ltd.	1,458	..
Randfontein Est. & G. M. Co., Ltd.	751	..
Durban Roodepoort G. M. Co., Ltd.	2,231	..
Jubilee Gold Co., Ltd.	603	12
Rand Central Ore Reduction Co., Ltd.	2,521	15
Henry Nourse G. M. Co., Ltd.	493	1
City and Suburban G. M. Co., Ltd.	664	10
New Heriot G. M. Co., Ltd.	1,151	12
Tribute G. M. Co., Ltd.	1,533	6
Johannesburg G. Extraction Syndicate (Geldenhuis)	25	18
Stanbope G. M. Co., Ltd.	542	..
Black Reef Syndicate	86	1
Orion Syndicate	974	..
Cbunes Recovery Syndicate	427	17
Treasury Syndicate	319	13
La Fortuna Syndicate (Stanbope old tailing)	293	..
Walter Long (Evelyn tailings)	147	14
Total Witwatersrand production	26,199	2

Other Districts.

Sbeba G. M. Co., Ltd. (Barberton)	679	8
Clewer Syndicate (Lydenburg)	453	5
Eastleigh Syndicate (Kleiksdorp)	265	5
Grand total	27,597	

In view of these results there should be no doubt of the value and efficiency of the cyanide system. It ought to come into general use in California. The South African miners have taught California miners a valuable lesson.

The Diamond Drill in Arizona.

The annual report of W. F. Staunton, superintendent of the Tombstone Mining and Milling Company's properties for the past year, has the following relative to the diamond drill: "Our use of the diamond drill covers a period of about 14 months. The first work was in the Lucky Cuss mine, using compressed air as motive power. Twenty-one holes were bored at this time, of an average depth of 116 62 feet, aggregating 2449 feet. Time of actual boring, 155.5 days of 10 hours. Average rate of boring per day, 15 75 feet. The cost was as follows:

	Total.	Per Foot.
Labor, including removals	$1,736.00	$ .708
Supplies	1,180.97	.482
Carbons	1,325.05	.541
Total, boring and removals	$4,242.02	$1.731
First cost of machine, less carbons	3,794.24	1.549
Total cost, includ. purchase of machine.	$8,036.26	$3.280

"The next work was a vertical hole on the Gilded Age claim to test the formation, and involved the sinking of a shaft 92 feet deep to reach rock of sufficient firmness to use the drill. A hole was bored to a depth of 354 feet below the bottom of the shaft. The cost was as follows:

	Total.	Per Foot.
Sinking shaft 92 feet	$1,298.54	$14.11
Boring 344 feet	1,266.56	3.68
Total 436 feet	$2,565.10	$ 5.88

"Finally seven holes, aggregating 259 feet, were bored in the Lucky Cuss sixth level, No. 3 winze, with a small machine purchased for the purpose, using hand power at first and afterward compressed air. The cost was $513.34 ($1 98 per foot), or, including the first cost of machine, $990.91 ($3.44 per foot).

"Summarizing the above figures we find that, exclusive of the first cost of the machinery and the cost of sinking the shaft, there has been expended on diamond drill work $6021.92, or $1.97 per foot. The grand total of expenditures on account of diamond drill work is $11,592.27, or $3.68 per foot drilled. The results obtained are not such as to encourage the continued use of diamond drills."

What is the Fastest Train on Earth?

TO THE EDITOR:—Americans are too prone to think they have the fastest express in the universe. Error! True, for long-distance running, the 90-hour flyer from the East to Chicago can't be beat, but then those engines are frightful coal-wasters, burning 45 pounds per average mile and minute, so that the "exposition flyers" are run at a heavy loss. Nothing like "prestige," however! Now, on the fastest British road, the locomotive draws 100 tons more, goes 10 miles an hour faster (for the short distance run of under 200 miles), yet does not burn half the coal of the wasteful American crack trains.

For years I have devoted attention to this subject, and have always been surpised at the ignorance of every community in the matter. Indisputably the English Great Northern has the fastest regular trains of any line on the globe; and the fastest in the world is that quitting Grantham (shire of Lincoln) every afternoon at 4:18 and reaching London, on scheduled time, at 6:15. The distance is 105¼ miles and the run is made without a stop.

I wanted to verify for myself this speed, so obtained a permit from Mr. Stirling to make the return journey to London on his masterpiece. The engine was boarded and Grantham left at 4:22 (four minutes late). Some 15 miles out the maximum of speed was attained and maintained throughout (one exception). This was as nearly as possible one mile per minute. The exception was in running through Peterboro, when the speed did not exceed 25 miles. Through all other stations, big and little, the engine and 16 carriages swept without the slighest reduction in velocity. The night was dark and foggy and nothing could be seen (except signals) 50 yards ahead. A dozen miles from London speed was gradually reduced and King's Cross run into exactly on schedule time, viz., 6:15. This four minutes had been made up and the 105¼ miles done without a stop in 1 hour and 55 minutes.

The English Great Northern has several trains running each way, daily, without stopping, between London and Grantham. There is one leaving King's Cross at 2 P. M., and reaching Grantham at 3:59. The others cover the journey in from 2 hours and 2 minutes to (with one or two stops) 2 hours and 10 minutes.

Owing to the steady motion of the cars one does not feel at all like being carried along at 50 miles an hour. On Mr. Stirling's 8-foot chief-d'œuvres, however, the traveling is rather different. There the vibration is in pretty full force. Naturally, the locomotives having outside cylinders, they have not the steady running of insiders.

During the nearly two hours' run from Grantham to London I noticed that neither driver nor fireman exchanged a solitary word, and as I (after handing over the engine pass) had no inclination to speak, we were all three "mute as mice" throughout the long run. The driver stood motionless at his post, only varying his position to bend down for a moment to the lamp, watch in hand, to note the time. About every five minutes the fireman shoveled in a half-hundredweight of coal, for these engines consume their full quota, and more, although the precise consumption is not at hand to give here. As for myself, I stood up in the left-hand corner of the cabin, having everything under view, yet obstructing nobody's view. I have the happy faculty of knowing how not to be in the way on a locomotive—of being practically *non est* while actually there.

There is a notable feature in connection with the departure of Great Northern express trains which I have never noticed on any other railway system in the world. No time-taking engineer who has studied this, the fastest transit railroad on the globe, will have failed to remark the particularity. I refer to this: That no sooner is the train started than it is almost instantly in full flight and out of sight. Take flying Scotch departs from King's Cross, for example. Ere you have noted your stop-watch seconds locomotive and cars have vanished! It is this facility for getting away at great speed which gives the Great Northern locomotives such a hand over other companies' engines, which (in comparison) dawdle out of their respective termini.

My experience of Great Eastern petroleum and coal-fuel locomotives causes me to accord a verdict in favor of the former. I have tried some of the Great Eastern's fastest engines. The best speeds are those between London and Cambridge—58 miles in 1¼ hours. This is quick running for the Great Eastern, which, however, has never acquired celebrity for very quick runs. In the run to Cambridge the engine gave some ugly lurches when sweeping round curves, almost staggering the occupants of the cab ("engine-legged" as they were). From Cambridge I walked across country to Buntingsford (22 miles) in 5½ hours, and rode back to London on one of the small engines used on that branch. LODIAN.

Chicago, August 7, 1893.

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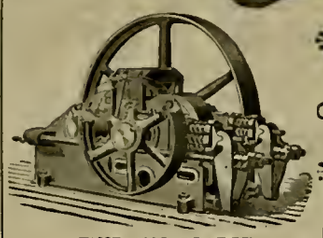

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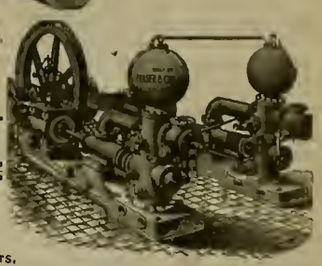

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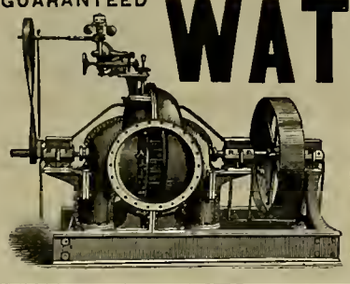

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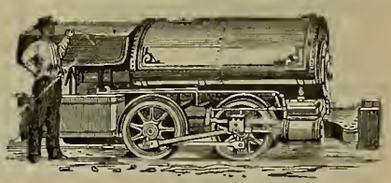

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Mechanical Progress.

Tests of Portland Cement.

At the recent congress of mechanical engineers in Chicago, in the discussion that followed a paper by Mr. Henry Faija on "The Manufacture and Testing of Portland Cement," Mr. Griffith, an English engineer who has long been engaged on marine harbor work, in which the use of Portland cement was an important feature, said that of late years there has been a tendency to use a light burnt cement to facilitate grinding, but this is a very unsafe practice. Standard tests should be as simple as possible, so that they may be carried out by engineers where laboratory appliances are not available. The saod test is not generally used in England, though used in Germany. Captain Black said that at St. Augustine, Fla., he had used a concrete of one part good cement, two parts sand, almost all silica, and four parts coquina gravel (small shells) in place of stone. Concrete made thus, and remaining in air, was in perfect condition after two years. That laid in water was soft and worthless, and that made in air and then placed in the water was also soft. He thought this to be probably the case with many concrete foundations, but, as the margin of safety is so large, it is improbable that this will ever be found out. On a concrete seawall of Resendale cement, in Florida, where puddles of seawater on the top were exposed to a very hot sun, the concrete under the puddles was so soft that a knife could be pushed into it, but on the face of the wall, where the water had no lodgement, the skin of the cement remained quite hard. Where a concrete face was exposed to the action of surf, it was abraded by the action of the sand in the surf. The interior of a cement test pat will harden later than the exterior.

The Malleability of Iron.

The mill manager of Messrs. W. Hallam & Co. of the Upper Forest Tin Works, near Swansea, succeeded in making a sheet of the finest appearance and thinness that has ever yet been seen by mortal eye, says the *Paper-Makers' Journal*. The iron from which the sheet was rolled was made on the premises. It was worked in a finery with charcoal and the usual blast; afterward taken to the hammer to be formed into a regular flat bottom; from thence conveyed to the balling furnace, and, when sufficiently heated, taken up to the rolls, lengthened and cut by shears into proper lengths, piled up and transferred to the balling furnace again. When heated, it was passed through the rolls, back again into the balling furnace, and, when duly brought to the proper pitch, was taken to the rolls and made into a thoroughly good bar.

It was then taken to the tin mills and rolled till it was supposed to be thinner than 23 grains, afterward passed through the cold rolls to give it the necessary polish, and it stands on record as the thinnest sheet of iron ever rolled. The sheet in question was 10x5½ inches, or 55 inches in surface, and weight but 20 grains, which, being brought to the standard of 8x5½ inches, or 44 surface inches, is but 16 grains, or 30 per cent less than any previous effort, and required at least 4800 to make one inch in thickness.

Four-Day Atlantic Steamer.

Thomas A. Edison is represented as believing in a four-day ship between New York and Queenstown, and as thinking that the Campania could make the journey in that time if it were not for the greatness of the amount of friction between the water and the sides of the vessel. This he believes will, in time, be largely reduced, and he has himself tried many experiments having that end in view. One of these was to have hydrogen gas produced along the sides of the vessel by electricity; but while this method worked admirably in artificial salt water, it would not operate with the brine of the ocean. He suggests the possibility that oil may in some way be mechanically applied to the hulk, so that the friction will be reduced to a minimum. When this has been accomplished, the ocean racers will plow through the waves as if they were birds going through the air, and the two continents will be brought nearly a thousand miles nearer together.

Penny-in-the-Slot Gas Meters.

Automatic gas meters, which are put in operation by dropping a penny (two cents) in the slot, are in use in Liverpool, England. There are in view of the householder three dials marked: "L," "S" and "D," and as soon as a penny is dropped into the slot the hand of the "D" dial records it. When 12 pennies have been dropped in, the "D" dial stands at "0," while the hand of the "S" dial records that one shilling's worth of pennies are in the drawer, and so on until £20 ($100) worth of gas is paid for. The hands can only move one way, so that by this invention the householder practically gets an indisputable receipt for the pennies he puts into the slot and the total amount he has paid for his gas. An indicator shows how many feet of gas are in the meter "paid for, but unconsumed." When all the gas paid for has been used the flame does not at once go out; but under a new arrangement the meter automatically warns the householder that the supply is nearly exhausted by gradually lowering the flame at least one hour before turning the gas off.

New Style of Scales.

A new pair of scales for the purpose of weighing tin is attracting attention in Australia, having been recently added to the equipment of the Mount Bischoff Smelting Works. They are designed upon the lever and beam principle, and are in effect an exaggeration of the balances employed by bankers. The scales, which are suspended from the beam by a center bar, are constructed of large, square plates, upon which the metal or weights can be placed with a facility which the corner chains generally used do not afford. A block is placed under each plate for the convenience of those handling the heavy material, in order to obviate unnecessary stooping. The scales are hung on steel bearings, with box and swivel ends. They are, moreover, so nicely poised that, although they could, if required, bear a strain of five tons, a few ounce weights will depress either side. The scales are raised from the blocks by means of hauling tackle, which moves the lever so easily that the work could be accomplished by a little child.

To Overcome Severe Grade.

Cases sometimes happen in the location of a street railway in which a very severe grade is unavoidable for a short distance, while the remainder of the line is comparatively level. To meet this condition of affairs a very ingenious device has been invented, and has been for more than two years in successful operation on a line in Seattle, Washington, says the *Engineering Magazine*. For a distance of 1000 feet there is a grade varying from 11 to 16 per cent. Two counterbalance weights, aggregating six tons, run on rails laid in a conduit underneath the track. These weights exactly balance an empty car and are attached to wire ropes running over pulleys. At the top of the grade, on its way down, the car picks up the rope and in descending hauls the weights up, thus checking its own speed so that the breaks will hold the load without difficulty. At the foot of the grade the conductor disengages the rope by a hand-lever. Going up, the connection is made automatically, and disengaged in a similar manner. A grade of 20 per cent may be readily overcome by means of this simple and admirable expedient.

Annealing Steel.

T. C. Lace, of Glenwood, Pa., in a communication to *Sparks*, thus discusses the annealing of steel:

In the majority of cases this is not well done. Sometimes steel is heated and thrown on the floor, perhaps in a draft or possibly it is buried on the forge or in something which will cool it as quickly as if it were in the air. A very good bed to anneal in is wood ashes or dry sawdust, but the first is the best as it is neutral. A low red heat will take all the hammer strains out of steel, but do not remove until cold, and above all do not heat too quickly to anneal, as there is no doubt that, in annealing, the inverse of the process of hardening is going on, not so violently perhaps as in hardening, yet at a certain rate, nevertheless. By this hasty heating I have broken steel, and not highly carbonized tool steel, but of course small sizes are less subject than large pieces to the action of the fire.

Scientific Progress.

Dr. Nansen's Polar Expedition.

After three years' preparation the Polar expedition under Dr. Fridtjof Nansen has finally sailed from Christiania, Norway, for the North in the good ship Fram (Advance), the first vessel that has been especially designed and constructed for Arctic research, says the London *Graphic*.

The party consists of twelve men, including Dr. Fridtjof Nansen, as leader of the expedition; Lieutenant Scott Hansen, R. N., as scientific member; and Henrik Blessing, M. D., as surgeon and botanist.

The expedition sails in the vessel Fram, which is a model of strength, but she is a trifle too small for the enormous amount of stores with which she has been loaded and which have brought her so down in the water that the ice sheathing has had to be heightened, while giving her hull the appearance of something between a Dutch koff and a Thames barge. The accommodation on board seems too cramped for twelve men. The main cabin or saloon measures but 6 ft. 3 in. in height, 13½ ft. in length, 16 ft. in width at the lower, and 11 ft. at the upper end, while the six sleeping cabins off it are diminutive. In the deck-house are a small chart-room and Dr. Nansen's study, both small in proportion, and on the whole it gives one the idea of being a neat little doll's house for twelve gigantic puppets. The stove in the saloon consists of an iron case containing numerous copper tubes, and is heated by paraffine lamps. Lighting will be electric or by means of lamps. The dynamo is worked either by steam, wind or hand power. A large windmill will be erected on deck, where there is also a winch which can be worked by four or more men, and, in order to give the hands sufficient exercise during the darkness, the latter will be daily resorted to in the winter months. The caboose, or kitchen, contains an ordinary cooking range, and also a very compact and handy copper stove, heated by lamps, the gift of a London firm. The engines are triple expansion, and to obtain a speed of seven knots, consume three and a half tons of coal a day, of which she carries a supply of about 350 tons, calculated for 200 days' continuous steaming at about four to five knots speed. The furnaces are constructed to burn petroleum, or even blubber, and under petroleum the vessel obtained on a trial trip the same speed as with coal.

The provisions are of various kinds, quantities being especially prepared on scientific principles, to give the men's stomachs the least possible expansion with the greatest possible quantity of nutriment. Clothing is of many sorts, from woolen jerseys and underclothing to fur outer garments and waterproof British linen. The sledges differ considerably from those taken by Astrup for the Peary expedition, being much lighter, from 9 ft. to 10 ft. in length, 1½ ft. in breadth, and about 6 in. in height. They are said, however, to be wonderfully tough, and capable of bearing heavy loads, and most are shod with German silver to protect the wood. Numerous Norwegian "ski" are also taken. The Fram carries seven large boats, including a naphtha cutter, of the ordinary sealing or whaling type, and will be used for the chase of walrus and seals and other sporting purposes, while two will be specially fitted for escape should any accident happen to the Fram herself.

Last summer Dr. Nansen changed his plans, and announced his intention of proceeding, not via Behring straits, but round the Norwegian and Russian coasts, to the spot north of the Liakov islands which will be the starting point for the journey on the ice to the Pole. By adopting this latter route the sudden plunge into the glacial stream is avoided, but the chances of not reaching his destination at an early date are very considerably increased, as the ice in the Kara sea may be impassable, and but very little is known of its conditions on the Siberian coast.

Man in South America

There is no part of the world that offers a more curious subject of speculation as to its future than the continent of South America, as was well set forth in an address before the American Geographical Society by its president, Mr. Gardiner G. Hubbard, says *Science*.

That the Amazon river system alone drains a basin of fertile land basking under a climate of perpetual summer, greater in area than the whole of Europe, is an astounding fact in itself. The vast territory is practically uninhabited. Its aboriginal population is disappearing, or has disappeared, and the whites, who in sparse numbers take their place, scarcely pretend to come with the expectation of remaining. There are tracts as large as the whole of France of which we know less than of any equal area on the globe. Tribes of men are living there who are yet absolutely in the stone age, and who, even by barter or distant rumor, never heard of the European race or the use of metals.

The question up to which Mr. Hubbard leads his reader is second in importance to none in the anthropology—that of acclimation. Is it possible for the white race, when it shall be endowed with all the resources of art and science which it is soon to have in its grasp, successfully to fight against the terrible odds of a tropical climate? He quotes in his favor the words of the historian, Buckle, and the naturalist, Bates. He might have added others of weight, but it cannot be doubted that most of the medical observers who have devoted themselves to this vast inquiry lean to the opinion that never will the white race flourish under tropical skies.

Mountain Chains as Barriers.

Dr. J. Rignault, in a lecture before the Ethnographical section of the Geographical Society of Paris, has drawn attention to the "Influence of Mountain Chains on the Distribution of the Human Race." His original observations resulted from a visit to Darjeeling and the Terai, but his conclusions are drawn from a study of the whole of Europe and Asia. He states the following laws: (1) When a chain of mountains, such as the Alps or the Pyrenees, separates two nations, . . . one generally thinks that the crest, the watershed, divides two races, each inhabiting his respective slope up to the summit. Nothing of the kind, and one can say that the crest of a chain does not separate two races. In support of this statement, Regnault says: This error is due to the fact that the crest generally serves as a frontier between two States. (2) Ordinarily the race

of tbe country toward whicb the lesser slope inclines inhabits not only this slope, hut crosses the crest and inhabits the more rapidly sloping side down to the plain in which the slope is lost. It is the junction hetween the rapid slope and the plain where the contact of the two races is to he found. To the second law he adds two postulates: (*a*) The mountain chain must he higb and long, as the Alps and Pyrenees. (*b*) The law is modified hy considerations of time, geology, climate, etc. Dr. Regnault discusses in some detail the Alps, the Pyrenees, Erz-Gebirge, Caucasus, and the Himalaya.

Scientific Facts.

Sir John Luhbock, who once kept a queen hee for 15 years, declares that a test proved that the eggs were as fertile at that age as they were 12 years hefore.

Scientists say that if the hed of the Pacific ocean could he seen, it would disclose to view several mountains with truncated tops scattered over it. These mountains would be perfectly hare at their hase, and all around tbeir tops they would be covered with beautiful vegetation of coral polypl.

An English medical journal suggests that the action of electricity on lead water-pipes may sufficiently impregnate the water with lead to cause poisoning. Here is a chance for some experiments with a view to determining whether water is thus affected or not under the conditions named. If it is, it might result in cases of serious illness, the cause of whicb ordinarily would he difficult to determine.

It is reported tbat Prof. Hermann has succeeded in photographing the vowel sounds hy speaking them into a phonograph which reproduced tbem slowly. The vibrations were recorded hy a microtelephone, which had a small mirror in the vihrating drum. A ray of light reflected from the mirror recorded its vibrations—that is to say, the vibrations of the vowel sounds—on a traveling band of sensitized paper.

New Precious Metals.

Gold and silver are no longer the precious metals of the world, says an exchange. An ounce of silver is wortb about 75 cents, an ounce of gold as a rule $20. Palladium, which was discovered in 1803 hy Wollaston, is a metal of steel-gray color and fihrous structure, and is paid for at the rate of $28 per ounce. Osmium, a brittle metal usually found with platinum, cost $35 per ounce, and iridium $40. Ruthenium, which is very hard and brittle, hrings $82 per ounce, and niohium, also called columhium, first found in New London, Conn., is a very rare metal, discovered in an ore oxide, is rated at $100 per ounce. Yttrium, discovered by Woebler in 1828, is a metal of grayish-hlack color, with a perfectly metallic luster, which is very rare. It is paid for at the rate of $120 per ounce, while lithium, the ligbtest of all metals, brings $150 per ounce.

Glucinum or heryllium, as it is also called, appears in the form of a grayish-hlack powder, made very lustrous hy burnishing. It has a market value of $185 an ounce. Barium metal, which was discovered in 1808, is worth $200 an ounce, and didymium, discovered in 1846, and very rare indeed, hrings $215 an ounce.

Varnish from Linseed Oil.

A German bas taken out a patent for producing varnish from linseed oil by means of an electric current. The oll, after being purified in a proper manner, is thoroughly mixed and agitated with sulphuric acid and water, and subjected to the action of an electric current for two or tbree hours, so that the oxygen produced in the nascent state hy the passage of the current converts tbe oil into varnisb. The varnisb so produced is said to he almost colorless and perfectly free from all mineral or metallic admixtures or impurities.

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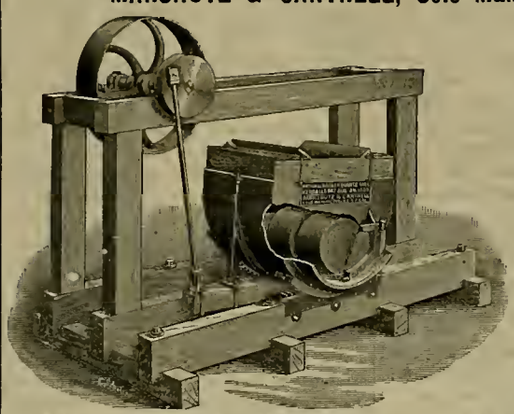

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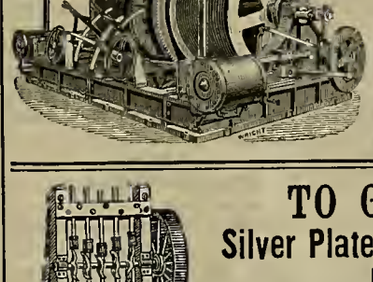

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Electricity.

The Magnetic Pole.

No one knows, and therefore no one can explain, the precise reason why a magnetized needle does point to that mysterious spot on the coast of Bothia Felix, and, strange as it may seem, there was in 1831 no visible trace of anything by which that spot could be recognized, not even so much as a small hillock in the immediate neighborhood, and the only means of proving that the magnetic pole had been reached was by the total inactivity of the compass at that spot, coupled with the almnst vertical position of the dlpping needle, says a writer in the *Cornhill Magazine*. On this most ioterestlog point the very words of Slr James Ross himself shall be given: "The amount of dip as iodicated by my dipping needle was 89° 59', being thus within one minute of the vertical; while the proximity at least of this pole, if not its actual existence where we stood, was further confirmed by the action, or rather by the total inaction, of the several horizontal needles then in my possession. These were suspended in the most delicate manner possible, but there was not one which showed the sllghtest effort to move from the posltion in which it was placed, a fact which even the most moderately informed of readers must now know to be one which proves the center of attractlon lies at a very small horizontal distance, lf at any."

A New Harbor Defender.

Captain McEvoy, of the Britlsh navy, proposes to put electricity to an ingenious use in naval warfare. He has invented the "hydrophone," whose office is to give warning of the approach of â hostile fleet in the darkness. The mechanlcal arrangement of the apparatus ls: An exceedlngly sensitive spring is arranged within a case, so adjusted that the slightest jar or vibratlon will cause it to move. Attached to the end of the spring is a piece of platinnm wire, which, acting in concert with the movements of the sprlng, will, when a current ls passed through it and a telephone receiver placed in the circuit, cause a distinct crackling sound to be heard in the receiver. The instrument for use is anchored several miles from shore and connected to the latter by electrlc circuit. The mere presence of an ncean-going steamship will create an intense crackling sound, and by an ingenious contrlvance will also set ln automatic motion an electric bell and an electric lamp. With such a protecting apparatus in successful operation it will be practically impossible to use torpedoes or to employ strategic means of approach with any degree of efficiency.

A Self-Reversible Trolley.

The following ingenious device for trolley cars is announced: "Mr. W. E. Hamllton, of the Shreveport, La., electric street railway, devised a plan by which the motorman of the car is not compelled to reverse the trolley pole when the car reaches the end of the line. The inventlon is a simple yet most effective one. It consists in raising the trolley wire at the terminus so that when the car stops the trolley pole is pulled into a perpendicular posltion by its springs. By this means, when the car starts back the pole is automatically reversed, and the motorman loses no time."

Storage Batteries.

A report on a set of storage batteries in a private installation, recently made by Prof. Weber of Zurich, shows that lt is possible, under proper conditions, to attain very favorable results, says the *Engineering Magazine*. He found the ampere-hour efficiency of the installation to be 96.5 per cent and the watt efficiency 82.4 per cent. He gives lt as his opinion, after a very extensive experience, that well-constructed, well-managed, and continually active storage batteries will yield on discharge from 92 to 97 per cent in ampere hours and 80 to 84 per cent ln watt hours. Other lnvestigators have discovered that it is of the highest importaoce to use both pure water and pure sulphuric acid, and that the slightest impurity has a very great effect on the efficiency of batteries. This ls a fact well known to many old telegraph men from their experience with primary batteries used in that service. The writer remembers an instance at Greensburg, Pennsylvania, in which he found it absolutely impossible to maintain a battery in working order which was made up wlth water taken from a creek in the neighborhood, although upon substituting rain-water, the difficulty vanished at once.

Electricity Cures Insomnia.

A typical case of insomnia is said to have been successfully treated by electricity. The form of the affectlon dealt with was that which usually accompanies neurasthenla or debility of the nerve centers. The patient at first showed great fear of the current. This dread is described as "the usual initial difficulty." The treatment conslsted of both local and general applications, mostly with continuons currents. The general treatment took the form of dipolar electric baths, commencing at 50 milliamperes for five minutes, and concluding with 150 milliamperes for 15 minutes. The local applications were made to the head in various ways with a current from two to five milliamperes for five minutes. The result was that the patient's sleep steadily improved till it reached an average of six hours out of the 24—" that is to say, that after seven weeks of treatment, consisting of about 30 seances and 12 baths, sleep was practically restored. Not only this, but the general health and moral condition were strikingly improved. Instead of dark forebodings and pessimistic views he talked cheerfully and hnpefully of going back to work agaln."

Vacuum Tubes Attract Each Other.

An interestlng experiment was shown at the recent soirees of the Royal Society by Sir D. Salomons and Mr. Pike, and these being continued ln the laboratory show that two vacuum tubes have a strong attraction for one another, whether they touch along their whole length or only at the ends—one of the tubes being of the shape of a dumb-bell, for lnstance. The experiments find that a spiral vacuum tube sucks in a "core" tube as a solenoid does an iron "core," and the more the "core" is drawn in the less luminous the "core" tube appears, the "core" tube not being connected to the circuit. When the tubes are placed end on they attract one another; nn repulsion takes place, which would occur if the effect were of a static nature.

Lamps in Queer Forms

A Western designer of advertising specialties has recently fonnd several ways to make use of the electric light, says the *Electrical Review*. In several Chicago saloons are incandescent lamps in the form of beer bottles of the ordlnary pint size, but of clear glass, with the brewer's label pasted on the outside. In clgar stores are cigar-shaped lamps with the names of cigar manufacturers on the labels encircling them. The grocery stores have lamps made ln imitatlon of cakes of soap, catsup bottles, etc.

Electric Engraving.

In the Electricity Building at the World's Fair, one of the most ingenious little devices exhibited is an electric engraving machine, and there is always a large crowd watchlng the process. The cutting point receives lts energy ln the form of rapid pulsations, and if the nperator is skillful in sketching he need only take this tool in his hand and gulde it accordlng to the design he wishes to engrave; and the work is done nearly as quickly as with a pencil. All sorts of souvenirs of the exhibition are engraved whlle the purchaser waits.

Success of an Electric Torpedo.

A London paper tells of a very interesting series of experiments with the Sims-Edison electric torpedo which have lately taken place under a special commisslon appointed by the French Minister of Marine. Three buoys were moored out at sea, at some distance from the Caraque Battery, and the electrical eogineer was requested to steer a torpedo rouod each buoy in succession, to test its electrical steeriog capacity. The sea beiog rough, a successful result was unlooked for; but, on the order being given to start, it was at once seen that the weapon was under complete control, the torpedo passing round each buoy in succession, stopplng, starting and returning to the point of departure at the wlll of the operator. The roughness of the sea appeared to have no effect upon it, the speed attained being 11 knots, and the cable paid out 1½ kiloms. Later, a special trial of speed was made, the sea being high, when two mlles were covered by the torpedo at the rate of 18½ miles an hour.

New Plan to Transmit Power.

An electric company at Portland, Or., has arranged a plant for transmitting power from the falls of the Willamette, 12 miles distant, upon a different plan from that usually adopted. Five 40-kilowatt transformers are connected in serles at the power station with a dynamo giving an electromotive force of 1150 volts, which is run at such a speed that the current goes to line with a voltage of 5000. At the sub-station in Portland, the voltage ls about 4000, and the current is taken off by four similar transformers, also arranged in series.

Useful Information.

Money of the World.

Actlng Director of the Mint Preston has prepared a table of the monetary systems of the world. The table shows that the aggregate stock of gold is $3,582,605,000; silver, $4,042,700,000; uncovered paper, $2,635,873,000.

Stock of gold possessed by different countries ls as follows: United States, $604,000,000; Great Brltain, $550,000,000; France, $800,000,000; Germany, $600,000,000; Russia, $250,000,000. The stock of silver is as follows: United States, $615,000,000; Great Britaln, $100,000,000; France, $700,000,000; Germany, $211,000,000; Russia, $60,000,000.

The stock of silver is divided as follows: United States, $538,000,000 full tender, and $77,000,000 limited tender; Great Britain, no silver full tender, $100,000,000 limited tender; France, $650,000,000 full tender, $50,000,000 limited tender; Germany, $103,000,000 full tender, and $108,000,000 limited tender; Russia, $22,000,000 full tender, and $38,000,000 limited tender.

The ratin prevailing in nearly all principal countries between gold and legal tender silver is 1 to 15½. The ratio between gold and limlted tender silver is as a rnle 1 to 14.38. The respective ratios in the United States are 1 to 15.98 and 1 to 14.95.

The varlous monetary systems as divided among countries: Gold and sllver—United States, France, Belgium, Italy, Switzerland, Greece, Spain, Netherlands, Turkey and Japan. Gold—United Kingdom, Germany, Portugal, Austria, Scandinavian Union, Australia, Egypt, Canada and Cuba. Silver—Russia, Mexico, Central and South America and India. Of the the uncovered money South America has $600,000,000; Russia, $500,000,000; United States, $412,000,000; Austria, $260,000,000; Italy, $163,000,000; Germany, $107,000,000; France, $81,000,000, and Great Britain, $60,000,000.

The per capita circulation of gold is: United States, $9.01; United Kingdom, $14 47; France, $20.52; Germany, $12.12; Russia, $2.21. Per capita of all classes of money is: France, $40.56; Cuba, $31; Netherlands, $28.88; Australia, $26.75; Belgium, $25.53; United States, $24.34; United Kingdom, $13.42, and Russia, $7.16.

Monkey Language.

Accordiog to a letter which Prof. Garner has written to his brother in regard to his experiments wlth the mookey laoguage, he has succeeded beyond his wildest hopes. He has written down nearly 200 monkey words, and considers there are only 20 or 30 more which have escaped him at present. "Achru" means sun, fire, warmth, etc.; "kukcha" means water, rain, cold, and apparently anythiog disagreeable; "gosku" means food, the act of eating. Prof. Garner travelled 120 miles northeast of Slerra Leone, and established hls battery with the phonograph and revolving mirror in a clump of banyans, in a forest region swarming with monkeys. "The glitter of the mirror soon attracted a host of chattering monkeys. I watched them for an hour, and then cautiously approached. They disappeared like magic when they saw me, all but one, a chimpanzee.

"When I got close to it I found that it took no notice of me, but stood as if transfixed, with widely-opened eyes and dilated pupils, gazing at the mirror. There was a slight tremulous motion in the limbs and a spasmodic twitching of the ears. I could hardly believe it—the animal was hypnotized. It was making a gutteral sound like 'achru.' When I subsequently listened to the phonogram I found that a similar sound was frequently recorded thereon, amid what was then to me an unintelligible jumble of monkey chatter. I put the monkey in a bamboo cage, and on examining it about an hour afterwards found it still under the hypnotic influence. I revived lt with a good strong sniff of ammonia, and held a llghted taper before its eyes. It was qulte tractable and said 'achru,' and a few more tests satisfied me that this word embodies the idea of heat, light, warmth and brightness. Other words followed, and it was wonderful to take note of his awakening intelligence."

Uses of Asbestos.

Asbestos is a mineral fiber of the hornblende variety. It derives its name from a Greek word which signifies "indestructible by fire." The ancients were familiar with its uses and the modes of obtaining it, yet, strange to say, alluded to it as a vegetable production. It was used at all their funeral rites, but partlcularly where cremation was practiced, the corpse being wrapped in an asbestos cloth to keep the ashes of the dead person from mingling with those of the wood or other combustibles used in incineration of the remains. The people of Egypt and many other countries of the ancients, especially the royal and wealthy classes, made towels, napklns, tablecloths, etc., of asbestos, and cleaned them by throwing them into the fire.

Utilization of Coal Dust.

The London *Times* gives an account of a process by which anthracite coal bricks are now being manufactured by the London Coal Brick Syndicate. The bricks are made of grains of anthracite dust, which are forced to cohere by means of a special cementing compound and of great pressure. The coal dust is mixed with the binding material ln the proportlon of 95 per cent of the former to 4 per cent of the latter. The compound is fed into a mlxer, where it meets a jet of steam, a stiff paste belng formed, which is delivered successively into a serles of molds

under a pressure of 25 cwt. As the mold-plate revolves, the charge in each mold is brought between two rams, which exert a pressure of two tons per square inch on each side of the charge, forming a very dense and homogeneous coal brick. The brick, still in the mold, passes on to the delivery ram and by it it is pushed out onto a table and is removed for the market. These coal bricks are said to make an excellent fuel, and to possess a very high efficiency for steam-raising purposes. The *Times* thinks that with such a fuel at the disposal of the public, there is room to hope for a reduction in the pollution of the atmosphere of towns.

Facts About the Fair City.

To-day, careful estimates place the population at 1,400,000, and the probability is that it is rather above than below that figure. The area within the city limits is 181 square miles. There is over $200,000,000 invested in manufacturing enterprises, producing annually upward of $550,000,000 worth of goods, and paying employes more than $100,000,000. The wholesale business of the city aggregates more than $500,000,000, and its commerce more than $1,500,000,000. Its meat products alone are valued at $135,000,000. The bank clearings are nearly $5,000,000,000 a year. Over $60,000,000 has been invested in public schools, whose maintenance costs from $5,000,000 to $6,000,000 a year. There are 800 private schools, 350 seminaries and academies, and four universities. The public library contains nearly 200,000 volumes, and has a circulation greater than that of any other in the United States. The other libraries of the city are estimated to contain over 3,000,000 volumes. There are over 900 daily and weekly papers and periodicals, and 700 literary organizations. There are about 600 churches. Over $300,000,000 has been expended in the construction of buildings since 1876, and the annual expenditure for this is between $45,000,000 and $55,000,000.—St. Nicholas.

An Adhesive Cement.

Equal proportions of gum tragacanth and tapioca are ground together and heated with water at about 70° Fah., after which there are added about 50 per cent of gum hog and an equal amount of starch, and the whole mixture heated at from 70° to 120° Fah., says the *Scientific American.* The cement thus produced is said to be superior to any hitherto known for the requirement of silk and cotton manufacturers, calico printers, hookbinders, hat and bootmakers, etc.

Population of Large Cities.

The large cities of the world, according to a recent publication, have the following inhabitants:

London (1891)	4,415,958
Paris (1891)	2,712,598
New York and Brooklyn (1890)	2,352,150
Berlin (1890)	1,763,543
Canton (1891)	1,600,000
Vienna (1890)	1,364 548

There are only 12 cities with over a million inhabitants, of which China rejoices in possessing four.

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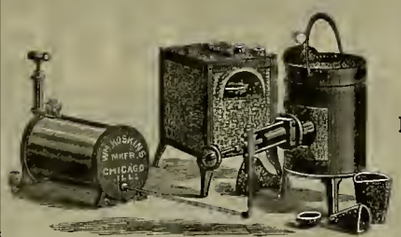

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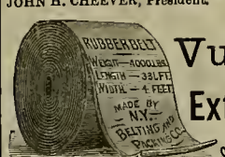

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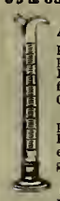

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Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scorification; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 130 12mo. pages, with illustrations, well bound in cloth; 1889. Price, $1, postpaid. Sold by DEWEY PUBLISHING CO., Publishers, No. 220 Market Street, San Francisco.

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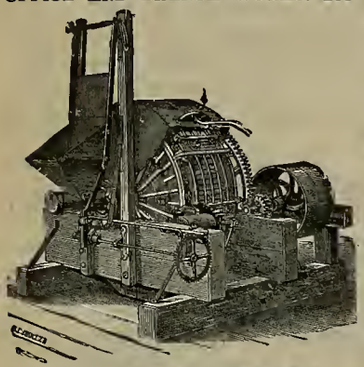

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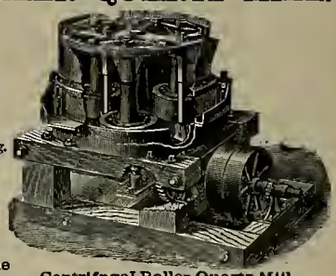

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Coast Industrial Notes.

—The estimated outpnt of Pnget Sonnd canneries this year is 300,000 cases. This is a 20 per cent decrease from last year.

—Weavervllle. Trinity connty, has decided to be lighted by electricity, and has made a contract with the General Electric Company to snpply the plant.

—The annnal report of the Pnget Sonnd customs district for the fiscal year ended July 1st shows that the value of foreign exports was $5,255,966. The duties collected on imports were $1,622,058.

—Commander Lndlow of the Mohican estimates the prodnct of pelagic eealing at 60,000 sklns this year, which, together with the catch of the lessees of the eal islands, will reach the value of $1,000,000.

—The Pacific Bank of this city is eaid to have sold out its interest in the San Diego etreet railway to a company in San Francisco that bas been snccessfnlly experimenting with storage-battery electric cars.

—The Park branch of the San Mateo electric road must be finished by the end of November or the franchise will be forfeited. The snrveyors began work last week on the line and the graders have followed them.

—The Execntive Committee of the Midwinter Fair is abont to ask for bide for bnildings. The five great bnildings are to be fitted even to the emallest and apparently most insignificant detail for the uses of the exposition.

—The contract for lighting Berkeley has been awarded to the San Francisco Electrical Company. The Oakland Gas Light Company refused to bid, protesting that the requirement that the old city plant be nsed wonld be a needless waste.

—The canneries on the Fraser river closed for the season Aug. 31st. The pack is estimated at 471,000 cases, which beats the record. The biggest previous pack was made in 1889, when 303,875 caees were pnt np. The pack on the northern rivers is very light, and will not exceed 80,000 caees.

—The Southern Pacific Railroad Company hae commenced the work of building a long, high trestle in the Honcnt bottom, between the town of Honcnt and Oroville. In places the railroad track will be raieed as mnch as six feet. Dnring the floods of last winter the railroad track near Honcut was snhmerged.

—The Black Diamond Coal Company has sent a commnnication to the Coast Seamen's Union asking, in view of low freights and dnll business, that the union consent that wages of eeamen be rednced from $40 per month to $35. It ie reported that other ehip-owners who employ nnion men will make a eimilar reqnest for reduction.

—The Sonthern Pacific Railroad Company has a large force of men at work building an iron bridge over the south fork of the Ynba river, in Snmmit valley. There is also a large force of men engaged in getting out 10,000 corde of wood in Ynba valley. Quite a large force of men is engaged in ballasting the railroad track between Antelope and Ben Ali.

—The Union Pacific has pnt in effect a new tariff for towing on the Columbia river, which reduces ratee from $100 to $60 on each veeeel. The reduction ie greatest on large veseels, euch as are engaged in the grain-carrying trade. The improvements made at Portland for deepening the channel have eecured sufficient water for the largest clase of ships to come and go fully loaded.

—The California Conetruction Company hae begun work on the Yuba cut-off under charge of Engineer Rumble. A force of men and teame were put at work laet week, and a few days thereafter they expected to have 100 teams and about 150 men at work, and will keep that number employed for almoet three months. They expect to complete the contract within four months.

—Surveye of the British ehip Cedarbank, which arrived here from Anstralia Jnly 27th with her cargo of coal on fire, are completed. Temporary repaire will consist of docking the ehip, ecraping her inside and out, repainting, calking the decks and putting in a patch of ceiling 24x35 feet. Approximate figures on repairs to be made here and at home are $8000; damage to cargo ahout the same.

—The California Dairy Aseociation hae been organized to protect and promote the dairy industry. Directors—William Niles of Los Angeles, Jamee B. Burdell and George Mason of Marin county, A. P. Martin and William S. Pierce of Sonoma connty, William M. Russ of Hnmboldt, P. Toanazzini, San Lnis Obispo; R. H. Brown, San Mateo; T. Duffy, Del Norte; M. Lynn, Monterey. No capital stock.

—Railroad conetrnction began in San Luis Obispo Monday, and 100 men are bnsy bnilding a massive stone and iron bridge across San Lnis creek, near the Hotel Ramona. The work ie now completed to ths town and when the bridgee are finished the stone men will be laid off. Work in the tnnnels is still progressing rapidly, bnt grading has stopped to await the completion of the tnnnele.

—The Associated Wholesale Grocers of California have incorporated to promote goodfellowship among the members and for mutual benefit and protection in bneiness affaire. There is no capital etock. The directors for the first year are Hermann Bendel, William Haas, W. B. Wellman, William Cluff, S. I. Wormser, J. Levi Jr., Webster Jonee, all of San Francisco, and P. C. Drescher and C. A. Lurhs of Sacramento.

—The Southern Pacific ie not qnite through cutting down expenses. A new time-card ie in preparation which will make a material redndction to the passenger eervice on the Western division between Oakland and Stockton. It ie not finished, and the changee will not be fully decided on till it is. Several trains will probably be drawn off, bnt as the travel by way of Nilee is light and of a general local character the change will affect few people.

—The Champion lumber mills, eitnated in the Sierra Nevada range, 30 miles east of Red Bluff, and operated by the Sierra Lnmber Company, cloeed down laet Thursday. The eeason has been a ehort one, only lasting three monthe. The average eeason's cnt of these mills for a nnmber of years paet has been 12,000,000 feet of lumber. Thie eeason's cut falls far below that fignre, being abont 7,000,000 feet. The reaeon given by the company for cloeing is lack of ealee.

—A temporary restraining order granted by Judge Henehaw on Satnrday laet, which prevented the East Oakland electric line from crossing the tracks of the Highland Park and Frnitvale avenue road at East Twenty-first etreet, Oakland, was dissolved Tneeday by Jndge Henshaw. As a coneeqnence, the work of extending the East Oakland line will be continued immediately toward Twenty-third avenue and thne into the territory which is now eerved by the Highland Park road and the Twenty-third avenne branch of the Haywards line.

—The following is a liet of biddere for furniehing the plumbing and heating apparatus for the Sacramento Federal pnblic building, according to two epecifications: Samnel Pope, Chicago, $12,890 and $12,320; Robert Clark, Peoria, Ille., $11,390 and $9,775; Chafer & Becker, Cleveland, $11,896 and $10,858; Frank Lyman, Sacramento, $15,933 and $14,993; Chae. B. Crnse, Milwankee, $11,924 and $11,464; J. F. Dalton, Chicago, $12,428 and $11,897; John Leyon, Waehington, D. C., $11,834 and $8,889.35; George H. Tay & Co., San Francisco, $14,990 and $14,590.

—According to the report of the Commiesioner of Internal Revenue, the total prodnct of beet engar in the United States for the year 1892 was 57,200,000 pounds, which was produced on 24,793 acres. By Statee the output was as follows:

	Acres.	Pounds.
California	15,993	43,500,000
Nebraska	4,900	7,000,000
Kansas	3,953	1,800,000
Utah	3,500	6,000,000
Virginia	400	700,000

The increase of California over 1891 was greater than the increase of any other State, and the average yield an acre far greater.

—At 8 o'clock on the night of August 31st a lamp exploded in Welle, Fargo & Co.'e express office, eetting fire to the building and Honey's hotel, burning all the bneiness portion of Copperopolis. The list compriees: E. B. Moore's ealoon, Moore & Hunt'e butcher-ehop, M. Honey'e hotel, Wells, Fargo & Co.'e expree office, Honey's saloon, Qneeto'e hotel, Blanchard's ealoon, Marzo'e harness-ehop, W. H. Caee's etore and barber-ehop, F. Fontana'e ealoon and barher-ehop, Watson'e aaloon, Copperopolis hotel, Roherteon's lodging-house, Western Union telegraph office and the postoffice. The Knights of Pythias building and two other buildinge were deetroyed. The contents of Fontana'e brick etore were destroyed. The estimated loss ie $75,000, with an ineurance of $4000.

—From an article on the coal fields of weetern Washington, contributed to the Journal of the Illinois Mining Institute by T. B. Corey, superintendent of the Oregon Improvement Co., the following etatistics of mine outputs for 1892 are taken:

	Tons.
Jennings, Skagit county	4,749
Blue Canyon, Whatcom county	25,675
Gilman, King county	103,000
Newcastle	160,000
Cedar Mountain	13,000
Black Diamond	90,000
Franklin	75,000
Alta	14,000
Kangley	25,000
Denny	4,000
Carbonado, Pierce county	152,000
Wilkeson	91,000
South Prairie	40,000
Acme	3,000
Bucoda, Lewis county	10,000
Centralia	7,800
Castle Rock, Cowlitz county	750
Kelso	2,000
Total	850,965

—According to fignres compiled by the *Puget Sound Lumberman*, the Northern Pacific Railroad ehipped from Washington dnring the first eix monthe of this year 57,960,000 feet of lnmber and 606,540,000 ehingles, reqniring 8155 cars, 3866 of which were ueed for lnmber. Dnring the same period in 1892 that road shipped 47,460,000 feet of lnmber and 324,040,000 ehingles. The Great Northern, from estimates fnrnished the Seattle *Trade Register*, ehipped 6,500,000 feet of lnmber and 331,500,000 ehingles. There were 147,015,570 feet of lumber ehipped by water dnring the firet eix monthe of thie year. This would give a grand total of 211,475,570 feet of lumber and 938,040,000 shinglee. The *Lumberman* gives the following rail totals by months:

	Lumber.	Shingles.
January	8,355,000	44,940,000
February	4,620,000	58,940,000
March	12,450,000	113,680,000
April	11,325,000	110,780,000
May	11,830,000	160,440,000
June	9,810,000	114,520,000
Totals	58,390,000	603,300,000

This estimate does not include all the ehipments made by the Great Northern.

Mining Summary.

The following is mostly condensed from journals published in the Interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MINING NOTES.—Amador *Ledger*, Sept. 1: The Bnnker Hill is having pipe laid to the Mayflower ehaft, preparatory to pntting in hoisting worke at that point. . . The Alma Company will have their hoieting worke in operation by the firet of October. That will be as soon as it is necessary, on account of the preliminary einking being more profitable with a windlass. The Alma people broke gronnd Monday, and put a night shift on Tnesday. They are going to progress with their work as rapidly as poeeible, and will have machinery and pipee on the ground in a short time. . . Everything looke well at the Bay State mine. They are still drifting north. The water ie decreasing slowly at the 300-foot level. The laet aseesement hae all been paid in and the pnrchaee price of the mine, $10,000, hae been paid. . . W. S. Weymouth of Drytown and Profeseor Holbrook of Sacramento are pntting in a five-stamp mill near Indian Digginge, in El Dorado connty, where they own a very fine mining property. . . J. C. Bell of Forty-Nine Flat reports everything flonrishing in the finest poeeible manner at the Bell-Reale gravel claim. A. Reale was up a few daye ago and brought down eome eamples of gold which went about 15 cents to the pan. . . The new four-drill air compressor recently put in at the Irma is of the latest improved pattern, manufactured by the Ingereoll Company. It runs the four drille which are ueed in that mine with the greateet poesible economy of eteam and wood, and provee most eatisfactory to the company.

MINE BONDED.—*Record*, Sept. 1: P. Fagan has bonded hie quartz claim, near this place, to Stockton parties. . . Peter King and Joe Bernardie are einking a ehaft on a quartz ledge a short dietance up Sutter creek. They propose to keep digging away on the claim ae rapidly ae their means will permit.

DEEP MINING PAYS.—S. F. *Report*: The Grover mine is eituated between Drytown and Amador City. The depth of the mine ie 1100 feet, and up to within the laet 40 days the mine hae ecarcely paid, it having been close work to meet the expenees. It is different now. Within the last 40 daye the minere have cut into quartz that paye $20 per ton and the quartz ie plentifnl. The mine ie being pumped to the depth of 900 feet by electric power, and now the company will go to work and put in electricity as a motive power for its entire working. The minere and managers over there have come to the concluaion that the country has only been "ekimmed" and that deep mining is the thing that pays.

Butte.

THE HUALETON DISTRICT.—Oroville *Register*: The Hurleton mining district extends from near the South Fork, a distance of eeveral miles toward Bangor and Wyandotte. The elevation is from 1400 to 2000 feet, and the country appeare to be a network of veins or lodes of gold-bearing quartz. The most prominent of theee are the Pactolian and the Phœnix. Work is being pushed on the Phœnix, so far as development ie concerned, hut the mill has had to shut down again on account of the lack of water. The rock is good and the lode widens and becomes richer as it is descended npon. The Pactolian promises to become a valnable mine, bnt none of the rock is being crushed, as the owners have not erected a mill. W. J. Powell has lately discovered a lode that ehowa excellent ore. The ledge ie 18 inches wide on top, and gets wider as it is descended npon. George McNair has etrnck a good lode on the land of A. McNair, and though only a few daye' work bas been done, the rock indicates good ore. H. P. Stow, in his mine, has cleared the shaft of water and the rock looks well. The Frenchwoman's quartz ledge is small, bnt the ore is valnable. The Andrewe lode indicates first-class rock.

AT A LIVELY CAMP.—Forbestown Cor. Oroville *Mercury*, Aug. 29: Dnring the past few daye the mercury has gone up eeveral degrees, ranging from 84° to 90°, and we call it quite warm for Forbestown. Col. McLanghlin, accompanied by State Mineralogist Crawford of San Francisco, and the mining expert, Mr. Chadburn of San Francieco, also the Hon. C. C. Belding, came up from Oroville yesterday. Thie morning Messrs. H. P. Stow and W. D. Cox went with them to the river to aee the Carliele mine, also a mine owned by Mr. Cox. Mr. Fred Hall and Leonard Adame of Clipper Mills bronght two of their city friends down to look over the minee to-day, and Dr. York went with them to the Gold Bank and Golden Qneen. They were much pleased with the mines and the manner in which they are worked.

Calaveras.

THE LINDERAXA.—Calaverae *Chronicle*, Sept. 2: The Linderaxa mine is sitnated near the Mokelnmne river, about a mile and a half from thie place, and is owned by Lee Vandel and Thomas Tynan. This mine has been prospected off and on ever since its discovery eome five years ago, the Sandy Bar Gold Mining Co., of which E. H. Davison of this place ie euperintendent, having had a bond of the property for some time; bnt it remained for the owners, Mesere. Tynan and Vandel, to made fnrther developments and prove the exietence of a well-defined and paying lead. A tnnnel has been run on the lead for a distance of 200 feet, and 70 feet from the mouth of the tunnel a winze hae been snnk to a depth of 50 feet. There are also two croescuts run west from the winze, the first one having been etarted abont eight feet down from the top of the winze and was only rnn ten feet when the lead was strnck; the second crosscut was etarted in the winze at a depth of 30 feet, and, after being rnn west for a dietance of 35 feet, the ledge was again encountered, the laet level cntting the ledge at a depth of 100 feet. The ore in both levele hae been thoronghly proepected, and shows an average of $40 to the ton. The ledge in the main tunnel ie between six and eight feet wide. The mine ie eo eituated that it can be worked to advantage hy a system of tunnels. There is a good chance for a mill-eite, plenty of available timber close at hand, and water can be obtained from the Mokelumne and Campo Seco canal under a 400-foot preseure if desired.

A BIG YIELD. — The famons Utica quartz mine at Angels, Calaveras connty, owned by Alvinza Hayward, the Hobart estate and C. D. Lane, yielded last month $25,000 more than the owners expected. The cleanup was made Saturday, Sept. 2, when Colonel Hayward, James Croee, repreeenting the Hobart estate, and Mr. Lane were present, and the gold bricke were bronght down by Meseenger McConnell and two other shotgun gnards of Wells, Fargo & Co. Thie wae the biggest cleanup at the Utica, and it was expected to be large, as a rich chute had been worked recently. The Utica ie a eteady producer, giving the owners more than $100,000 every month, and rock ie in eight for seven years' more work for the 100 etamps now rnnning. The vein ie 50 feet wide, and is now being worked at a depth of 800 feet, where it ie growing better. The mine costs to run about $40,000 a month.

NEW MILL.—*Citizen*: R. Leonard informs us that he has ordered a five-stamp mill for his mine on Murray creek.

Mariposa.

NEW MACHINERY.—*Gazette*, Sept. 2: Mr. Wm. Johns, who has bonded the Ward mine, is bringing a large amount of machinery to place at hie mine, and teams are busy hauling lumber and timbere to him.

Nevada.

THE SPAINO HILL.—*Tidings*, Sept. 1: The Spring Hill mine, located north of the Idaho mine, and owned by James M. Lakenan of thie city, hae been bonded to E. B. Thomas, J. F. Cooper and others. Yesterday a cleanup of six loade of quartz, crushed at Gauthier'e mill, yielded $180, or $30 per load. The ore was taken from a depth of 30 feet, and is said to be identical in character with that of the Idaho. The company has 100 tone of ore now on the dump.

GOOD YIELD EXPECTED.—Grase Valley *Union*: Supt. Skewes of the Gold Flat mine eaye there is a ledge about two and a half feet in size at the mine, which showe free gold. Although the gold is very fine, it is expected that the next crushing from thie mine will yield very well.

MAY START AGAIN.—S. F. *Report*: For the paet 22 years the Stockton mine, located about four miles eouth of Grae Valley, has been idle. The ledge wae worked ahout 22 yeare ago by a company of men from Stockton, and they only snnk the ehaft down to 130 feet. There has been $60,000 in gold taken from the ledge during its activity. A gentleman from Colorado named J. Burrowe has charge of the property and is representing a company of men with ample meane, and they intend to thoronghly proepect the ledge. The work of cleaning out and repairing the shaft has been commenced, and a whim has been erected. The ledge is quite

small as far as the bottom of the shaft, but indications show that it will widen as depth is attained. There is abundauce of water-power.

STRUCK GRAVEL. — *Telegraph*, Sept. 4: The company consisting of James Vineyard, James Pollard, Wm. Morgan and a number of others are doing well with their gravel claim down on the Yuba river, below the Bourn ranch. For some time the company has been busy fixing up an apparatus whereby the water could bs handled and the gravel in the river bed reached. The gravel has been struck at the depth of about 10 feet and it is said to be very rich in gold. It is thought that tbey have only struck the top of the channel.

MINE LEASED.—*Union*: Messrs. Smith and Riley have leased the Shoefly mine, an extension of the Osborns Hill mine, to Sacramento parties for a period of one year, with the privilege of buying at the expiration of that time for $10,000. The claim is very favorably situated for the discovery of a good mine.

Placer.

NEW COMPANY.—Placer *Herald*, Sept. 2: One of the new mining companies is the Santa Fe. Its members are all Auburnites, viz.: Jas. Hill, J. W. Morgan, M. T. Barnett, Dan Kirby and Prof. Hszsn. They are working at Canada Hill and think they have something in sight. Thos. Monaghan of Rock Creek left last week in company with Mr. Hill with a load of tools, provisions, etc. The Black Canyon mine, near Westville, is making a good showing under the able supervision of Geo. West. The Hogsback, at Westville, still remains idle. The White boys, at Ophir, are now running a 300-foot level to tap the chute. In their last cleanup, about two weeks ago, they realized $3000. It is rumored that the St. Lawrence mine, at Ophir, will start up again in about a month. Work is going right along at the Thres Stars mine at Ophir, the property of the Denver Co. and B. F. Hartley. One mile of pips will be laid, giving over 600 feet fall to run the hoisting works and dynamo. Most of the lumber is on the ground for the buildings. A contract for two 50-foot shafts has been let to Chris Lindley for $12 a foot. Pike Bell has been hauling a lot of his rock from near Clipper Gap to Col. McCullough's mill at the Minerica, below Auburn. It will be crushed in about a month.

AT FOREST HILL.—*Republican:* The Forest Hill divide is enjoying a season of prosperity, and the future prospects were never better. The gold output now is something like $70,000 per month, and upward of 500 miners are employed. Mr. Anthony Clark has just effected a sale of 560 acres of mining ground to the Gray Eagle Mining Company, which will at once drive a tunnel on the property, which they hope to complete in about ten months. Mr. Clark ie also pushing a tunnel on some valuable mining ground.

EXTENDING THE DITCH. — *Sentinel*: Water is now running through the South Yuba ditch to Long ravine and from there down to Bear river, where it is again taken up by the Bear river ditch. In a year or two this ditch will be extended down by Colfax and thence to Clipper Gap.

Plumas.

AT GIBSONVILLE.—Plumas *National-Bulletin*: The Feather Fork Mining Co. is pushing work on Thistle Shaft and employing a large force of men. Much gravel is being extracted from the great mine. Some of this is being washed, but a part of it is stored, awaiting a better water supply for washing purposes. At Slate Creek, the enterprise recently embarked in is progressing very favorably. Of the large flume 2½ miles have been completed, leaving a half-mile yet to construct. It is of a very substantial nature, on a graded and solid foundation, the flume being five feet wide at the bottom and nearly four feet deep. Capt. Gourley considers it one of the best mining propositions in the State, likewise the property of Packer, Hendell, and others, situated immediately below it. For years Slate Creek has been the ground or sluiceway for numerous hydraulic mines in that vicinity, and it is confidently believed that the bed of the stream is rich in placer gold. A few days ago some of the gravel, 15 feet from bedrock, was worked as an experiment, and it paid two ounces to the man. The large flume will enable the company to work the entire bed of the stream. The Taber mine, lying immediately east of the Thistle Shaft property, is being opened up. A tunnel to open up the great channel of gravel is being pushed ahead, and it is believed that only a few hundred feet farther ahead the rich deposit will be found. That thie channel is rich in gold work at Thistle Shaft has demonstrated beyond any doubt whatever.

San Bernardino.

FIND OF ALUMINIUM.—A correspondent of the Los Angeles *Herald* eays there is a vast deposit of aluminium in San Beruardino county along the line of the Santa Fe road. It ie a soft shale, free from silica and other impurities, aud feels like soapstone to the touch. As electricity is necessary for the reduction of the clay in which aluminium is found, and that can be cheaply generated in this section, this find may prove to be worth millons of money.

Sierra.

GOON ROOK.—*Messenger*, Sept. 2: We were shown some fine rock that was recently taken out of the upper tunnel of the Wm. Tell mine, at Sierra City. In the lower tunnel some 50 or 75 feet is expected to briug them into the pay chute, which, if it is only one-third as rich as it is in the tunnel above, will prove a bonanza for the plucky owners. The stock is mostly owned by Sierra City people.

Shasta.

THE QUARTZ HILL.—*Free Press*: Tbe parties who some time ago bonded the Quartz Hill mine, owned by Harrison and others, have paid an additional sum on the property, and they are to pay $32,000 more. The company is a Polish one, and represented by a gentleman named Marinsky. * * * A ten-stamp mill and other machinery lies at the depot for the Gladstone mine. This machinsry was purcbased by Capt. Clark and moved from Soda Springs, Idaho, and will be added to the mill already in operation at the mine, giving the company a capacity of 20 stamps.

Ventura.

DEPOSIT OF MICA.—J. H. Robb & Co. have opened a deposit of mica in the Piru district, Ventura county, which promises to become very valuable. Mr. Robb discovered the ledge last April and bsgan work on it in June. The surface croppings were only about an inch wide, but at a depth of 8 or 10 feet the lsdge has widsned out so that sheets eight inches square are taken out, and the ledge is still widening. He has offers of $4 to $7 a pound for all the clear mica that will average four to eight inches in width, and apparently there is a large supply that will come up to these requirements.

NEVADA.

Washoe District.

ON THE COMSTOCK.—Tbe week ending Ssptember 2d was a favorable one for the Consolidated California & Virginia and Hals & Norcross mines. At the Consolidated California & Virginia they extracted from the openings 52 feet below the 1650 lsvel 425 tons of ore and shipped to the Morgan mill 346 tons. The average car-sample assay of this ore was $41.72 per ton, and the average battsry-sample assay was $37.56 per ton. Thsse were the highest weekly averages in a long time. The usual work is being done in the mine. A small amount of $20 ore is being taken from openings 52 feet above tbe 1500-foot level. The official letter from Hale & Norcross is the most encouraging received from that mine in several years, and mentions a new and important discovery of ore. The lstter reads as follows: "On the 900 level west crosscut 1 from south drift was advanced 8 feet; total length 70 feet; face in porphyry; have also been digging a drain in south drift the past week. 1300 levsl—Completed winze station during the week, and sunk ths winzs 8 feet. Tbe bottom of the winze is all in ore of very good quality; extracted from the winze 14 cars of ore; average assay value $38.80 per ton. The ore is widening and improving in quality as it is being sunk on." The Potosi mine continues to yield a large amount of ore. During the week there were extracted and sent to the mill 424 tons and 750 pounds of ore from the 1000 and 1180 levels. Milled during the week 992 tons and 300 pounds on hand. On hand at mill, 133 tone and 700 ponnds. Average battery assays, $21.58. Average car-sample assays, $22.05. Shipped to the United States Mint at Carson 393 pounds of crude bullion. The east crosscut on the 850 level is cutting quartz which gives low assays. It is likely an upraise will soon be etarted to follow some of the streaks. The management has strong hopes of the 650 and 750 levels of tbe mine to the eastward. The Savage mine continues to yield a small amount of good ore, which is also being milled. Some good ore is also being taken from the Yellow Jacket. In the Kentuck Con. the south drift from the joint east crosscut is iu 53 feet; face in low-grade ore. Have etarted an east crosscut from the end of said drift. Have extracted from the etopes in west ledge about 25 tons of ore per day, of the average value as per car eamples of $7.75 per ton. At the Occidental Con. they continue to extract from the west ledge, above the 400 level, from three to four tons of ore per day of the average assay value of $33 per ton, as per car samples. From the other Comstock mines there is little of interest.

East Walker District.

CRUSHING GOLD ORE.—Hawthorne *Bulletin*: The Gignoux quartz mill on East Walker river started upon the 26th inst. on gold ore from the Round Mountain mine, the property of Rae & Norton. Mr. Norton informs us that but five stamps will be dropped for the present; also that they have 200 tons of ore ready for crushing.

Silver City District.

SILVER CITY NOTES.—Dayton *Times:* A. M. Cromer and Jack Harris are taking some good ore out of the Pioneer tunnel. The Alhambra mine, of Silver City, etarted up last Monday. H. J. B. Scheel is superintendent of this mine. The Red Jacket company, of Silver City, has again resumed operations on their mine. They have two men on shift. The Umatilla mine owned by Henry Scheel, ie looking very well. He has recently refused $12,000 for the property. There is some talk of running a trestle from the Golden Eagle mine to the Dazet mill to convey ore to the mill from the mine. The south extension of the Buckeye, owned by Stock and Dunn, will create the next excitement in mining circles in Siver City. The Boston and Lester mine in Silver City is looking better than it has for a long time. They expect to have another working of ore eoon. Sam Cummings, who has eome ground leased from Fred Bierke, has a clean-up every two or three weeks from which he nets $200 or more. Jolese Lawson has purchased another quarter interest in the Last Chance mine. He now owns half of the property. The claim is near the Buckeye. Foote and eons are doing some work on the Badger mine. Considerable dead work will have to be done, but the prospect is good for a rich development. The Flora Temple mine, opened by Wilson & Blair, is looking well. A recent clean-up at the Dazet mill made the boys several hundred dollars richer. The Del Rey mine, in Devil's Gate district, this side of the Oest, leased by "Butch" Geyer, is showing up some very rich sulphuret ore, and "Butch" will have a big clean-up soon. Three different strikes have been made in the Combination tunnel. These strikes were all made in the Golden Eagle, owned by Keating, Zadig and La Crouts, and show very rich ore. The clean-up of 150 tons, or thereabouts, of Haywood ore, worked at Taylor's mill netted about $3500. The owners will shortly put on several mors msn, and do some extensive work. The Schesl and Foote litigation has been settled, Mr. Scheel gaining the strip of ground he desired, and there will soon be considerable work done on those mines and in that ueigbborhood. Lockermau and Collier, who have a lease of the Pedröli mine, below the Buckeye, in Devil's Gate district, have taken out some very rich ore, and had it sacked. The ore is very rich, some of it going $1000 per ton.

ALASKA.

AN ALASKAN MINE.—S. F. *Chronicle*, Sept. 3: H. Moose and a couple of other miners arrived yestsrday morning on the schooner Emma Claudina, Captain Nielson, seventesn days from Ugak, Alaska. The miners claim to have discovered a rich gold mine and are bound East to secure funds to develop it. The story told on the schooner is that a drunken prospector went into a camp nsar Ugak and bragged about a gold mine that he had found. He backed up his statement with the exhibition of several valuable specimens of ore. That very night a party set out for the claim, the location of which had been fully described, and jumped it. Men wsre left to hold it while those that came down secured capital to develop the mine.

ARIZONA.

NEW GOLD MINES.—Tucson *Enterprise*: Quite a local excitement has been stirred up by assays made from the mammoth iron-stained quartz ledges in the uorthern part of the Tucson mountains. These ledges are immense affairs, where the ore can be quarried out with very little expense. They ars but a very few miles from the Santa Cruz river aud about 14 miles from Tucson. Being so very extensive and displaying uo particular evidence of value, they have for many years remained undeveloped, being located from year to year. Quite recsntly B. C. Brichta had a little work done on a claim thsre, and at a depth of five feet took out ore that yields over $56 per ton in gold. On ths surface the rock goes from $4 to $8 per ton in gold, and of this ore tbere is enough in sight to keep many hundrede of stamps busy for years to come. No one knows to what depth the pay ore reaches, but from the apparent strength of the croppings and the increased value in depth, it is conjectured that the discoveries are very important ones. Already many locations have been made and some development work will shortly be done to determine the extent of the ore body.

WATER FOR MINES.—It is now proposed to pipe water from the canyons of the Santa Ritas to the Graterville gold fields. The work intended is, saye the Arizona *Citizen*, hydraulic mining. Everything is favorable for it. The water runs down a canyon of the Santa Ritas. This carries a stream six months a year of sufficient volume for mining of that kind. Between this etream and the gold fields is a hnge limestone divide. In one place a gap in it is only 250 feet higher than the gold fields. The gold fields propsr are, Mr. Hughes declares, the biggest placering proposition in America, and probably in the world. They have produced since their discovery, 19 years ago, about $2,000,000 in gold. Ever since they have been worked. At present 250 men are there working out the yellow dust and tiny nuggets with rockers in a very primitive fashion. On the flats there for thousands of acres the precioue dust is scattered.

OUTLOOK GOOD.—The outlook for the gold fields of tbe Superstition, says the Mesa *Free Press*, grows brighter. Three eight-hour shifts are now operating in the Mammoth taking out the glittering ore. The new town of Gold Field is growing steadily. A postoffice has been established and a echool district has been formed. The working ehaft of the Mammoth is now down 90 feet, and the ore body increases in extent, while its richness continues to be the wonder of the old miners. Work on the 20-stamp mill ie being pushed with all possible haste.

IN MOHAVE COUNTY.—Kingman *Miner*, Sept. 2: A good streak of ore has been founu in the bottom of the Occident mine, White Hills. Peter Caffrey is still at work on his new find near the Cincinnati mine, and is getting out rich ore. Joseph Morrow has sold a one-half interest in the Lucky Joe gold mine in Gold Basin to Frank Ferraris. The drift in the Nighthawk mine is now being driven in at a good rate. More men have been put on, and some good ore is being taken out. Frank O'Dea & Co. have leased the Prosperity mine, and will soon commence work thereon. The Prosperity is one of the best mines in the county. J. W. Gerritt has quit sinking on the Rural mine, at Mineral Park, and has etarted a crosscut to cut the vein from wall to wall. The drifts are showing up good ore. U. S. Jackson, S. W. Mix and Dick Cleve have located three claims iu Wallapai mountain and have named them the Grand Prize, Ward and Old Gray Eagle. The Grand Army mine at White Hills is now producing enough water to supply the hoisting plant with all it uses, besides furnishing all that is used in and around ths other mines. The person or persons who will put a concentrating plant below Cerbat will be rewarded by big returns on the investment. The gold ores in and around that camp are rich, and can be made to yield handsome returns. Tom Steen has been taking out considerable ore from the old Jennie mine, in Weaver district, whiçh he has had worked at the El Dorado Canyon mill. He has a splendid ahowing of ore in sight iu the mine, and will commence stoping as soon as the canyon mill starts up again. The Kingman Sampling Works will resume operations during the coming week. They will be ready to sample and purchase all kiuds of ore. John C. Potts came in from White Hills yesterday, and will remain in town with hie family several days. He informs us that the leasers on the Princs Albert mins have struck ore in new places, and that the mine is now looking better than for many months past. Stockton Hill, at one tims the best camp in northern Arizona, is now almost deserted. For years the miners on the Hill produced immense quantities of rich ore, and there are still vast quantities in the mines, but, being silver, they will uot now pay to work.

IDAHO.

WORK FOR MINERS.—A Spokane, Wash., dispatch of Sept. 1, says: The first beneficial movement resulting from the recent rise in the price of lead will be felt to-day in Burke, Idaho, when 200 men will be put to work on the Poorman mine, which will resume operations in full. The terms of the miners will bs met by the owners no compromiss having been effected. The men had been offered a sliding scale, which was rsfused. Supsrintsndent Clarke said to-night that the rise in lead made it possible to pay the wages demanded. The mine-owners at other points in Cœur d'Alens are still endeavoring to adjust a new scale, but it is rumored that the example of the Poorman will be followed pretty generally at an early date. It is gsnerally agreed that the outlook for a compromise is dubious and that if work is resumed it will be at tbe old terms, which include an arbitrary scale of $3.50 per day for all labor, skilled and unskilled, bsneath tbe surface.

SEVEN DEVILS COPPER.—Wsiser *Signal*: R. C. Eckes, tbe expert who represents the Salt Lake men who contemplate putting in the smelter at Seven Devils, arrived last week and went into the camp in company with Mr. Hoyt. Mr. Eckes was amazed at what he saw in the camp. He said: "For the last five months I have been chasing around after copper prospects, and in all the prospects I have examined during that five months tbere is not as mucb copper combined as thsre is in one location in ths Ssvsn Dsvils." He said that all tbe prospects he had examined in Utah, Wyoming and elsewhere would not supply enougb copper to keep ths Salt Laks refinery rnnning a month and that the compauy needed just sucb a source of supply as the Seven Devils, and would undoubtedly take hold right away. Mr. Eckes figured that on the Peacock, taking it from the road level without going down, there were 180,000 tons of ore. Producing 300 pounds to the ton this would yield 54,000,000 pounds of copper, which at ten cents would be worth $5,400,000. Tbis ie all in sight.

MONTANA.

ONE SILVER MILL RUNNING.—Butte *Inter-Mountain*, Sept. 1: The miuing industry is at a very low ebb in Butte. During the week the forces at some of tbe Anaconda mines have been curtailed. The usual forcee are at work at the Boston & Montana, Bntte & Boston and Heinze smelter. The Colorado company and the Butte reduction works are running light. The Moulton is the only silver mill in the district in operation. Superintendent Clark says about 15 men are working in the mine, but they are not producing enough to pay expenses. The mill is running almost entirely on custom ore. Many miners who had leases had to continue at work upon them regardlees of the price of silver, and they have been compelled to sell their ore for whatever it would bring. Mr. Clark saye he is handling about $20,000 worth of cnstom ore a month. The general feeling about town is not so depressed as it was a fortnight ago. There are a large number of people idle, and many have struck out for otber places. The resumption of work on the Anaconda railroad has had its good effect. This, together with a large force being put on the street improvement, has given employment to nearly 1000 men. During the week the Granite Mountain and Bimetallic companies closed down, throwing 200 men out of work. It is said the Hope company of Phillipsburg will resume very soon.

OREGON.

NEW 100-STAMP MILL.—Baker City *Democrat*: A big mining company has been incorporated at Tacoma, Wash., and the seat of operation will be within 45 miles of Baker City. The company has been styled the Bonanza Mining Company, and the capital stock is $10,000,000. The new company has located 220 acres of land on Big Eagle creek. There is an inexbaustible supply of ore, there being two mountain-sides of it. The quartz is decomposed, is easily handled, and can be operated on the broadest scale. The rock assays from $3 to $10 per ton, free gold, which is exceedingly good. It is stated that the company will put up a 100-stamp mill and will work the prospect on a broad scale. The directore are Henry Raymond of San Francisco, E. L. Lewie of Chicago, C. B. Asken of California, Stephen Ryder, W. F. Sargeant, John W. McKeehan of Tacoma, W. C. Bronson and L. Rice of Portland.

CLEANING UP.—Jacksonville *Times*, Sept. 1: The Sterling Mining Co. is engaged in cleaning up, and the prospects for a good yield are excellent. Ennis & Cameron of Galice creek have finished their season's work and made a satisfactory clean-up. Messrs. Noah & McCracken of Sam's valley are engaged in prospecting a quartz ledge, which promises well. A very rich discovery is reported from Sucker creek, Josephine county, near the big cave. Tbe quartz is said to be very rich in free gold. The Burleigh drill employed at the Asbland mine is doing good work and has progressed over 200 feet. The rock is becoming softer and more headway is being made. Hosmer, Anderson & Co. of Foot's creek district, who have finished cleaning up, were in Jacksonville one day last week. They realized several thousand dollars from their season's work. The *Times* was in error last week in stating that J. L. Wilder was putting together 2500 feet of hydraulic pipe for Simmons, Cameron & Co. in Waldo district. It is at Ennis & Cameron's mines in Galice creek district that he is doing the work.

Market Reports.

The Markets.

SAN FRANCISCO, Sept. 7, 1893.

The silver market shows little change. The effect of hostile legislatinn by Congress has already been largely discounted, and, if the repeal hill passes, and is signed, it is not likely that a further heavy decline of prices will result. Silver purchases for the past month (August) have been less than 3,000,000 ounces, indicating that the policy of the administration to do as it pleases relative to silver, regardless of law, is to be carried out.

The highest and lowest prices fnr silver in London and New York for August were:

	London.	New York.
Highest	34⅞d	75¾c
Lowest	32 11-16	70¼
Differences	2 3-16d	5¾c

In July the difference between the highest and lowest London prices was 2¾d and 6c in New York.

In July the London market npened at 37¾d and closed at 33⅛d. The highest price during that month was 34¾d. The New York market opened at 70c and closed at 69¾c, the highest being 75c.

Since January 1, 1893, the highest and lowest prices in each month have been as follows:

Months.	New York—Highest.	New York—Lowest.	London—Highest.	London—Lowest.
January	84c	82½c	38 9-16d	38⅛d
February	84¼	83¼	38⅛	38¼
March	83⅝	81⅞	38⅜	37 9-16
April	83¾	82⅛	38 5-16	37⅞
May	84⅛	82¼	38 9-16	37⅝
June	83¼	82	38¾	30½
July	75	69	34⅞	32½
August	75¾	70¼	34⅞	32 11-16
Extremes	84¼c	62c	38¾d	30¼d

The lnwest prices ever recorded were in June, 1893, the Londnn market touching 30⅛d nn the 30th and New York 62c nn the 29th.

The Metals.

Copper, lead and tio have all showo ao advancing tendency during the week. The improvemeot seems to have come largely from betterment of general financial cooditions.

The Coal Trade.

J. Steuart's Coal Circular for August contains the following review:

Notwithstaoding the quietoess which has characterized the coal trade during the past few months the deliveries have beeo free and show ao average increase for the month of August, as compared with the same month io the past three years, of about 35,000 toos.

The total deliveries for the past three months, when compared with corresponding months of last year, show an increase of about 70,000 tons.

The deliveries in port during August were as follows;

Tons—	1893.	1892.
Australlao	18,400	15,500
Great Britaln	23,100	3,000
Eastern	.....	600
British Columbla	37,700	25,200
Port of Seattle	12,200	15,600
Port of Tacoma	28,600	15,200
Other mines	1,800	5,900
Totals	121,800	85,000

Total deliveries during 1893, to date, 827,500 toos; 1892, 794,500; 1891, 856,020; 1890; 666,160.

Quicksilver Trade.

The receipts of quicksilver at this port io flasks have been as follows:

Mooths.	1893.	1892.
Jaouary	2,243	1,701
February	2,388	1,543
March	1,588	1,875
Aprll	1,623	1,901
May	2,511	1,598
Juoe	2,790	1,614
July	2,014	1,632
August	1,909	2,013
Eight mooths	17,066	13,877

Against 8985 for the first eight months of 1891, 8202 in 1890, and 10,488 io 1889.

Silver and the Metals.

NEW YORK, Sept. 7.—Following are the closing prices for the week:

	Silver io—Londoo.	N. Y.	Copper.	Lead.	Tin.
Thursday	34½	74	9 60	3 70	19 30
Friday	34	73¾	9 60	3 70	19 40
Saturday	33⅜	72¾	9 90	3 62	19 40
Monday	33⅞	72¾	....	....	.....
Tuesday	33⅞	73	9 65	3 70	19 50
Wednesday	33⅞	74	....	3 65	19 40

San Francisco Metal and Coal Market.

ANTIMONY.		QUICKSILVER.	
Per lb	@ 13	Home trade, pr. flask	40 00 @40 50
BORAX.		STEEL.	
Refined, in car lots	— @ 7¾	English, lb	— @ 18
Powdered, do	— @ 7¾	Canton tool	— @ 8¼
Concentrat'd, do	— @ 6¾	Sh'k Diam'd tool	8½@ 15
All grades jobbing at advance.		Pick & Hammer	6½@ 10
COPPER.		Machinery	4 @ 5
Bolt	23 @ —	Toe Calk	— @ 4½
Sheathing	23 @ —	PIG TIN.	
Ingot, jobbing	— @ 20	Spot ₱ lb	21¾@ 22
Do, wholesale	15 @ 16	COAL.	
Fire Box Sheets	22 @ 24	SPOT FROM YARD—PER TON.	
IRON.		Wellington	$8 00
Bar, base	— @ 2½	Greta	7 50
Norway, base	— @ 4½	Nanaimo	6 50
PIG IRON.		Gilman	5 00
Spot.		Seattle	6 50
Eglinton ₱ ton	—@— —	Coos Bay	5 50
Glengarnock	27 00@— —	Cannel	9 00
Am. Soft, No, 1	25 00@— —	Egg, hard	12 00
Shotts No 1	27 00@— —	Wallsend	7 25
Puget Sound	—@— —	Scotch Splint	8 00
Clay Lane White	30 00@— —	Brymbo	7 50
Langloan	27 00@— —	West Hartley	7 50
Gartsherrie	27 00@— —	TO LOAD—PER TON.	
Barrow	—@— —	Australian	5 50@— —
Cargofleet	—@— —	Liverpool Steam	6 87@— —
LEAD.		Scotch Splint	7 00@— —
Pig	— @ 4½	Cardiff	7 00@— —
Bar	— @ 5	Lehigh Lump	10 00@— —
Sheet	— @ 6	Cumberland	8 50@— —
Pipe	— @ 5½	Egg, hard	9 00@— —
SHOT.		West Hartley	7 50@— —
Drop, elzes *smaller* than B, ₱ bag of 25 lbs	$1 75	COKE.	
Do do, B and *larger* elzes ₱ bag of 25 lbs	2 00	English, to load	$9 50@10 00
Buck, Balls and Chilled do, ₱ bag of 25 lbs	2 00	Do, spot, in bulk	—@12 00
		Do, in sacks	—@14 00
		Cumberland	9 50@— —

The Stock Market.

SAN FRANCISCO, Sept. 7, 1893.

The volume of business in the stock market continues very small. More favnrable reports from the Comstock have given a better tone to a few stocks, but it has not appreciably increased activity in speculation. The question of miners' wages is yet unsettled, and, it is claimed, is a serious factnr in depressing prices. It is said that officers' salaries have been reduced and that the next legitimate place to bring down expenses is miners' wages from $4 per day to the California level of $3.

The following companies report having had balances on hand September 1, 1893, with the expenses for August unpaid: Andes, $9703.41; Alta, $328.64, with $19,173.63 due from C. Derby, late treasurer of the company; Alpha Consnlidated, $4901.99; Bullinn, $15,837.68; Best & Belcher, $9908.07; Bodie Consolidated, $8722.66; Caledonia, $8507.27; Challenge Consolidated, $1086.24; Consnlidated Imperial, $1579.33; Consolidated New York, $1026.09; Consnlidated California and Virginia, $42,615.89 in cash and bullion of the assay value of $31,196.10, with further shipments to arrive; Crown Point, $1460.31; Exchequer, $880.68; Gould & Curry, $7097.21; Hale & Norcross, $1221.86; Independence, $41.55; Justice, $505.68; Lady Washington, $94.62, with $4577 due fmm C. Derby, late treasurer of the company; Mexican, $20,557.52; Mnno, $5037.36; Nevada Queen, $518; Navajo, $1702.05; Ophir, $2082.69; Occidental Con., $1348.18; Seg. Belcher, $1294.18; Sierra Nevada, $5263.17; Savage, $11,730.31; Silver Hill, $182.52; Standard Con., $24,917.86; Union Con., $7280.63.

The followlng mining cnmpanies report having an indehtedness September 1, 1893, with the expenses for August unpaid: Belcher, $13,853.91; Belle Isle, $292.05; Bulwer Con., $2777.47, with the company's mill about tn he started upon an accumulation nf good ore; Chollar, $4742.82; Cnmmonwealth, $26,431; Confidence, $2535.14; Del Monte, $25,086.60; Grand Prize, $767.45; Kentuck Cnn., $2753.98; Nnrth Belle Isle, $3888.97; Overman, $3388.81; Pntosi, $19,073.84; Silver King, $8057.97; Utah Cnn., $1142.45.

The Brunswick Coosolidated Mining Cnmpany of Grass Valley has levied ao assessment of two cents per share, delinqueot October 6th.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING AUGUST 15, 1893.

503,806.—GLOVE CABINET—A. Bever, Spokane, Wash.
503,807.—MEAT BROILER—F. M Blamyer, Olema, Cal.
503,567.—GALVANIC BATTERY—C. H. Brown, Portland, Or.
503,455.—SPRAYING DEVICE—J. J. Dugan, Salem, Or.
503,313.—EGG-CARRIER—T. S. Fitch, Alameda, Cal.
503,281.—SAW GAUGE—C. F. Fowler, St. Helen, Or.
503,477.—FAUCET—W. F. Harris, S. F.
503,484.—VENTILATOR—P. H. Jackson, S. F.
503,322.—FIRE ESCAPE—J. R. Jones, Fresno, Cal.
503,145.—CULTIVATOR—J. Killefer, Reolance, Cal.
503,426.—ELEVATOR SAFETY ATTACHMENT—C.B.Lahatt, S F.
503,488.—BRAID RACK—A. H. Marten, San Jose, Cal.
503,497.—STRAP ATTACHMENT—Robbine & Walrath, Sacramento, Cal.
503,331.—FENDER—J. P. Rowan, Los Angeles, Cal.
503,490.—SNAP BUCKLE—G. F. C. Schroter, Redding, Cal.
503,389.—TOY—J. Sheppman, S. F.
503,390.—ENGINE STARTER—Small & Noyee, Sacramento, Cal.
503,506.—LUBRICATOR—C. E. Traves, Los Angelee, Cal.
503,222—SEWING MACHINE ATTACHMENT—G. Tucker, Los Angelee, Cal.
503,513.—BICYCLE—H. S. Williams, Maderia, Cal.

NOTE.—Coples of U. S. and Foreign patents furnished by Dewey & Co. In the ehortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

RAISIN TRAY TURNER.—M. B. Skaggs, Brentwood, Cal. No. 504,254. Dated Ang. 29, 1893. This invention shows an apparatus which is adapted to receive a large nnmber of trays of raisins or other fruits, and hold them so that they may he tnrned over and the opposite side exposed to the drying infinence of the sun, the amonnt of labor heing greatly redneed.

TRANSPORTING LOOS.—Wm. V. Allen, Chico, Cal. No. 504,191. Dated Ang. 29, 1893. This invention consists of a novel mechanism for transporting logs hetween distant points by means of an endless traveling rope, a clamp by which the logs are connected with the rope or disengaged therefrom, and skids or ways over which the logs are hauled.

AIR BRAKE.—Wm. H. Masterman, Oakland, Cal. No. 504,227. Dated Ang. 29, 1893. This invention consists of an attachment for air brakes which allows the anxiliary reservoir upon each car to he snpplied with air and the desired pressure maintained without releasing the air pressure in the brake cylinders, and it also allows a supply of air directly to the brake cylinder, to maintain or incrense the pressnre therein.

ENGINE GOVERNOR.—Geo. E. Dow, S. F., Cal. No. 504,205. Dated Aug. 29, 1893. This invention consists of single oppositely acting plnngers operated hy the engine to he governed, and acting throngh the medium of a liquid fulcrnm upon the engine valve.

OVEN.—Wm. H. Weister, S. F., Cal. No. 504,184. Dated Aug. 29, 1893. This invention consists of an oven adapted to he nsed in conjunction with oil and similar stoves, and in which improved means are employed for the distribution and regulation of the heat within and aronnd the oven.

SURGICAL SPLINT.—Reinold Hoppe, S. F., Cal. No. 504,218. Dated Aug. 29, 1893. The object of this invention is to provide in one simple instrument a splint which is universally adjustahle, so that it may be applied to fractured limhs, npon the hack in cases of cnrvature, and generally to support, straighten or strengthen injured or malformed parts.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, September 7, 1893.

9:30 A. M. SESSION.

150 Bodie	20c	150 Hale & Norcross	55c
200 Chollar	30c	50 Potosi	55c
450 Crown Point	25c	400 Sierra Nevada	50c

2 P. M. SESSION.

100 Alta	15c	20 Mexican	55c
50 Andes	15o		

Pacific Stock Exchange.

9 AND 10:15 A. M. SESSIONS.

500 Alta	13c	100 Gould & Curry	28c
100 Andes	15c	300 H & N	53c
100 Belcher	37½	300 Mexican	55@54c
250 B & B	57c	1000 Ophir	83@78c
300 Chollar	27@25c	1100 Potosi	55@52c
300 Con. Cal. & Va	1.30	1200 Savage	35c
200 Crocker	5c	250 Yellow Jacket	52@50c
1000 Crown Point	.25@24c		

2:30 P. M. SESSION.

50 Best & Belcher	54c	150 H & N	51c
100 Chollar	25c	200 Mexican	56@55c
50 Crown Point	24c	200 Overman	5c
200 C Imperial	2c		

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ASSESSMENTS.

Company and Location.	No.	Amt.	Levied, Delinq't and Sale.	Secretary.
Alhambra M Co, Nev	17	25c	July 14, Aug 18, Sept 11	F S Schwarze, 324 Washington
Alpha M Co, Nev	60	25c	July 31, Sept 4, Sept 25	E B Holmes, 309 Montgomery
Bay State M & Dev Co, California	16	2c	Aug 26, Sept 28, Oct 25	A J Coster, Plymouth, Cal
Belcher M Co, Nev	46	25c	July 31, Sept 4, Sept 25	C L Perkins, Mills Bldg
Bodie Cons M Co, Cal	16	15c	July 24, Aug 28, Sept 25	M E Willis, 309 Montgomery
Brunswick Cons G M Co, California	6	2c	Sept 4, Oct 6, Oct 24	J Stadtfeld, 56 Nevada Block
Bulwer M Co, Cal	8	10c	July 29, Aug 31, Sept 22	L Osborn, 309 Montgomery
Carmelo Land and Coal Co, Cal	6	$2	July 21, Sept 1, Sept 29	R McDoble, Mills Bldg
Chollar M Co, Nev	35	10c	July 31, Sept 5, Sept 26	C E Elliott, 309 Montgomery
Clinton M Co, Cal	2	15c	Aug 9, Sept 15, Oct 2	C E Gunn, Mills Bldg
Confidence S M Co, Nevada	23	25c	Aug 7, Sept 11, Oct 2	A S Groth, 414 California
Dora Gold Mining Co, Cal	1	5c	Aug 25, Sept 25, Oct 25	Chas J Blumentnal, 415 Montgom'y
Eclipse M Co	5	5c	July 27, Sept 4, Sept 25	O Tum Suden, 216 Bush
Evening Star M Co, Cal	10	1c	Aug 9, Sept 12 Sept 30	J J Scoville, 320 Sansome
Exchequer M Co, Nevada	36	1c	June 29, Aug 31, Sept 21	C E Elliot, 309 Montgomery
Gray Eagle M Co, California	33	3c	July 10, Sept 6, Oct 4	Chas C Harvey, 309 Montgomery
Herold M & M Co., California	6	13c	Aug 10, Sept 16, Oct 3	M E Willis, 309 Montgomery
Inyo Marble Co, Cal	21	5c	Aug 8, Sept 12, Oct 12	W W Sargeant, Mills Bldg
Jackrabbit M Co, Cal	4	5c	Aug 10, Sept 15, Oct 6	Thos Wetzel, 320 Sansome
Justice M Co, Nev	55	10c	July 31, Sept 5, Sept 25	K E Kelly, 309 Montgomery
Martin White M Co, Nevada	29	25c	Aug 31, Oct 26, Dec 14	K L Ross, 120 Sutter
Mexican M Co, Nev	48	25o	July 17, Aug 22, Sept 12	C E Elliott, 309 Montgomery
Ophir M Co, Nev	60	25c	July 31, Sept 4, Sept 25	E B Holmes, 309 Montgomery
Overman S M Co, Nevada	68	5c	Sept 1, Oct 5, Oct 26	Geo D Edwards, 414 California
Seg Belcher and Mides Con M Co, Nev	12	10c	July 24, Aug 29, Sept 18	E B Holmes, 309 Montgomery
Sierra Nevada S M Co, Nevada	105	20c	Aug 2, Sept 6, Sept 25	E B Parker, 309 M ntgomery
South Eureka M Co, Cal	5	1½o	Aug 2, Sept 4, Sept 29	A Halsey, 318 Montvomery
Teresa M Co, Mex	11	10c	Aug 9 S pt 11, Sept 27	K J Willats, 309 Market
Telrakoff S M & M Co, California	10	1c	Aug 18, Sept 28, Oct 19	W J Gurnett, 308 Pine
Utah Cons M Co, Nevada	19	5c	Sept 1, Oct 4, Oct 25	A W Havens, 309 Montgomery
Ventura Asphalt Co, Cal	1	5c	July 11, Aug 26, Sept 18	F. A. Brooks, Monkey Block
Waterloo G M Co, Cal	1	15c	Aug 2, Sept 6, Sept 25	J M Bailey, 18 Post
Yellow Jacket M Co, Nev	55	25c	July 29, Sept 5, Oct 9	W H Blauvelt, Mills Bldg

MEETINGS.

Company and Location.	Meeting.	Secretary and Office in S. F.	Date
Gem Mining Co	Special	A C Hammond, Room 39, Merchants' Exchange	Sept 9
Mono G M Co	Annual	M E Willis, 307 Montgomery	Sept 21

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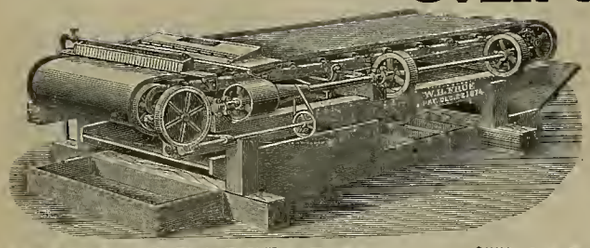

Manufactured under Patents of April 27, 1880; September 18, 1883; July 24, 1888; and March 31, 1891.

GLADSTONE MINING COMPANY, C. J. Clark, M. E. Gen'l. Supt. FRENCH GULCH, Calaveras Co., Cal., Dec 12, 1891.

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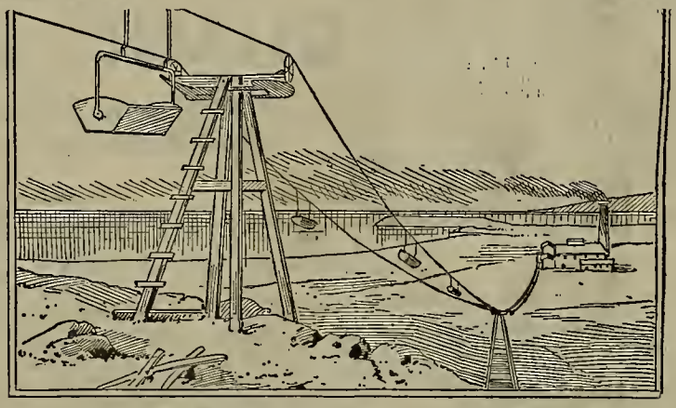

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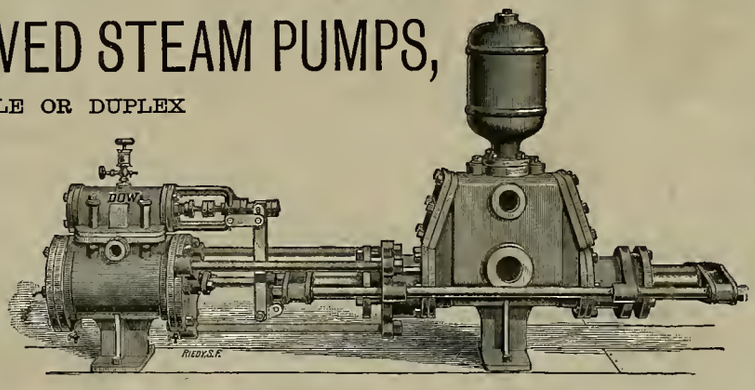

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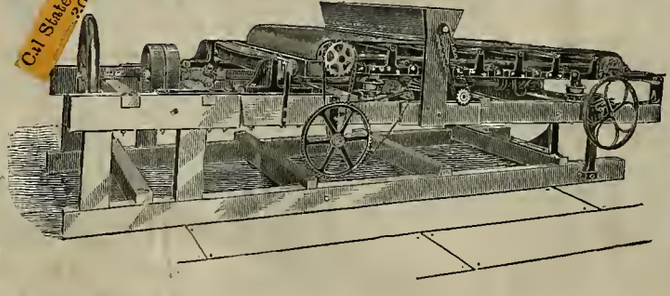

FALLS MINE, IGO, SHASTA CO., CAL., May 25th, 1893.

MR. THOS. MCGLEW, President McGlew Ore Concentrator Company—Dear Sir: I take much pleasure in endorsing your very superior Ore Concentrator. When I was requested to examine your concentrator, I did so under protest, declaring that I would have none other than a Frue, as after many years experience with different concentrators, I believed them to be the best.

Now, after a thorough trial of the McGlew Ore Concentrator, on ores difficult of concentration, I emphatically pronounce it the best concentrator of any I have ever used in handling my ores. It is doing CLEANER and CLOSER work than I had believed possible for any concentrator to accomplish.

Samples of pulp and tailings, taken every hour, dried, mixed and assayed, show * * * from West ledge, a saving by your concentrator of 94½ per cent; from East ledge, * * * a saving of 92 per cent.

The concentrator runs very easy and requires but slight attention. One man attends to rock-breaker, crusher and concentrator.

You have a good concentrator, and it can be relied upon to handle any ore that will concentrate. I most heartily recommend it to the mining public. Yours respectfully,

E. L. BALLOU, Propr. Ballou Reduction Works

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VOLUME LXVII. Number 12.

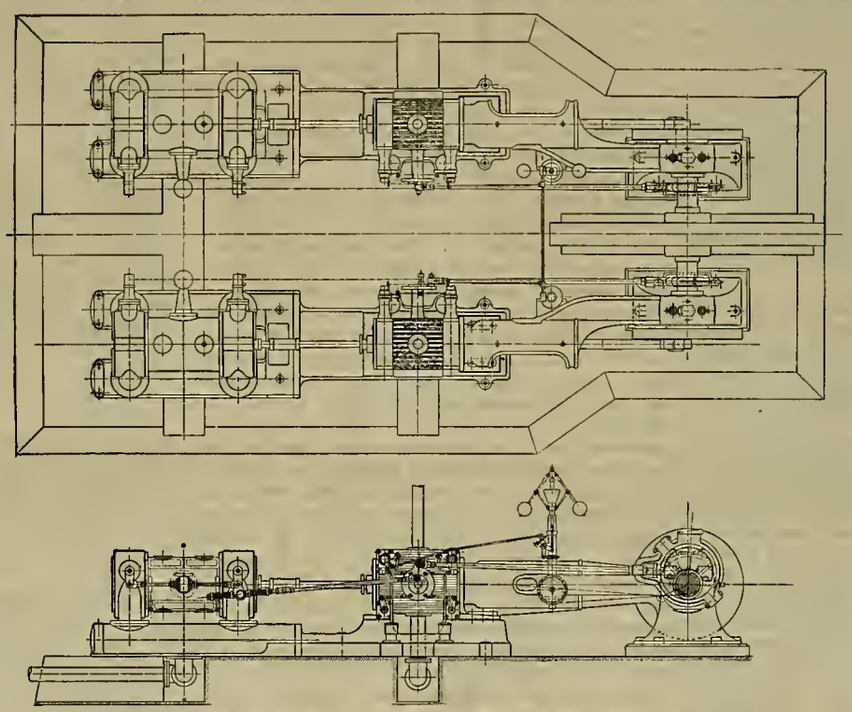
SAN FRANCISCO, SATURDAY, SEPTEMBER 16, 1893.

Three Dollars per Annum. SINGLE COPIES, 10 CENTS.

CALIFORNIA STATE

Riedler Air Compressor.

The accompanying illustration is the plan and elevation of the standard horizontal Riedler air compressor, as furnished for the Horn Silver Mining Co. of Utah. These may he employed as gas compressors, or blowing engines. The peculiar merits of the vertical system apply in the highest degree to the horizontal air compressors. In their circular describing this type of compressor, the manufacturers say: "Compressor cylinders are often connected with the steam cylinders by two rods, liable to spring and yield, a cheaper construction than that which is here employed, but liable to cause trouble and limit the speed of running. The compressor cylinder is here placed on a substantial bed-plate going through to the frame of the engine, and enabling us to utilize to the fullest extent the advantages of high speed peculiar to the Riedler system. Not only are the air cylinders provided with water jackets, but we avoid all trouble of heating at the stuffing boxes by also surrounding them with large water jackets. One suction and one delivery valve are placed on either side in the cylinder heads, and are easily accessible for any attention they may require. Clearance is reduced to a smaller percentage than with other systems, and occasions no loss of efficiency. We use our bed-plates as air pipes—a neat and economical arrangement—the main pipes and connections being well placed and accessible. A careful design of parts for the proper distribution of all stresses, ensures great durability in the machinery. Easy-running shafts, with large and well-fitted bearings, reduce expense for oil. Piston rods are unusually heavy, and wearing surfaces at the stuffing boxes are unusually large, to avoid wear upon the cylinders and pistons.



PLAN AND ELEVATION OF HORIZONTAL RIEDLER AIR COMPRESSOR.

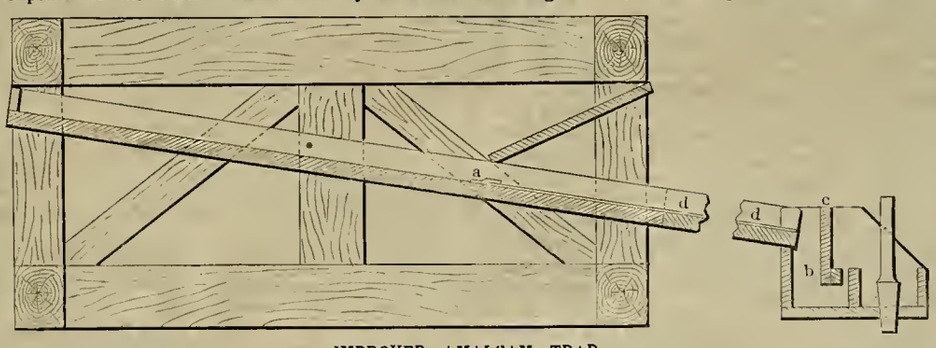
"Special valve details are used where gases are to be pumped, which tend to destroy ordinary valve seats. The Riedler system, with its large valve spaces and high lifts to the valves, is better adapted than any other for this class of service.

"Indicator cards of our Riedler air compressors, of either horizontal or vertical types, give practical proof of the theoretical advantages of the system, showing a higher percentage of useful work than obtainable with any other type of air compressor. The usual arrangement of our compressors, compounding cylinders, realizes the highest economy, and it is only for small sizes, or for blowing engines under special conditions of service, that we recommend twin or single simple air cylinders."

PROSPECTS are good that the Cœur d'Alene mines will resume operations within a month. Mr. Sweeney, one of the large owners, announces that, owing to the recent rise in lead, preparations are being made to begin work.

Improved Amalgam Trap.

On this page is shown an improved form of amalgam trap, to be used at the lower end of the amalgamating plate of the Dodge pulverizer, or any other crushing device. (a) represents a rubber strip tacked over the edge of the amalgamating plate; (d) the amalgamating plate; (b) the quicksilver or amalgam trap, and (c) is a sliding dash board. By this device the amalgam or quicksilver not caught on the plates is saved. The Parke & Lacy Co., of this city, are agents for the trap.



IMPROVED AMALGAM TRAP.

THE semi-annual statement of the Broken Hill Proprietary Company, Australia, published on another page, is of much significance, and will be of especial interest to silver miners of the United States in their time of trouble. The Proprietary Company's mine is now the greatest in the world. The Broken Hill mines are altogether the most marvelous silver deposit ever discovered, the Comstock lode alone excepted. Dsspite the low price of silvsr, the Proprietary mine is still worked at a profit, appearing to justify amply the claim of its owners that it is able to produce silver cheaper than any other mine.

First License to Mine.

The first license to mine by the hydraulic process under the Caminetti law was granted by the Debris Commissioners, last Saturday, to the Eureka Lake and Yuba Canal Company, at the Farrel mine, in Nevada county. It is announced that operations under the permit are to begin at once, monitors are in place, and water is ready to be turned on.

The action of the commission in response to the application of the Farrel mine-owners is of special significance and importance, outside the fact that the permit is the first issued in accordance with law and that the actual operation of new legal provisions is thus formally inaugurated. The Farrel mine was several years since enjoined by the courts and its owner fined for continuing to operate in defiance of the injunction. It had been idle during the interim, and the property, like hundreds of others estopped from work by the paralyzing clutch of the anti-debris agitation, was wholly valueless to its owners. When the hearing on the application to resume took place, last week, the attorney of the Anti-Debris Association was on hand, and entered a most vigorous protest, his main contention being that the debris of the mine had once been held by the courts to be detrimental to the Yuba river, and that conditions had not changed since the former lawsuits, the dam was inadequate, and the rivers were without sufficient protection. The representation was made by applicants, however, that the dam had been strenghtened and repaired, and that it was fully able to restrain debris to the extent of its capacity. Any valid objection which might exist to the working of the mine, on that score, therefore, was wholly removed.

It is evident that the commissioners completely coincide in this view. They have examined the mine and its equipment, and, as engineers, they consider themselves fully competent to decide whether the dam will restrain. By this decision they announce their line of action in several important respects: They propose to rely on their own judgment as to the capacity of restraining works to restrain. They intend to assist in the resumption of operations at mines closed down under the Sawyer decision wherever practicable and lawful. They will assist the hydraulic miner by every legitimate means, considering that it is the design of the Caminetti law to foster and encourage that industry without damage to other interests, and not to strengthen the hands of agitators and professional grangers in their crusade against the miner. It is their duty and their purpose to respect and protect all interests; but they have found that property of immense value yields no return under the decision, and they interpret the law to mean that this industry, as far as practicable, shall be restored to a measure of its former vigor and value.

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Our latest forms go to press on Thursday evening.

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San Francisco, September 16, 1893.

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FEW PEOPLE have an adequate idea of the number of Chinese engaged in placer and pocket mining in California. There are literally thousands of them, and they can be found in the hills and along the streams from the snow-capped Siskiyous to the sandy boundaries of San Diego. They are industrious, frugal, and generally capable miners, and the amount of gold they have taken out is enormous. Revenue Collector Quinn of San Francisco makes a very interesting calculation of the earnings of the Chinese of all classes, whose average population in this State for 30 years was 131,000. Most of them, he says, were employed in mining, and he thinks they have averaged 75 cents per day above expenses, in this and other pursuits. In 30 years their net earnings in all branches of industry reach the astounding sum of $810,000,000, much of which has come from the mines, and all of which the collector thinks went to China. The figures are probably an exaggeration, but they are interesting as showing the very important factor the Chinese have been in developing the mines and other industries of the State.

THE inventor of the new black-sand gold-extracting process, mentioned in this paper last week, turns out to be A. J. Hopper, who has made several surprising chemical and metallurgical discoveries in times past. Among other things ascertained by Mr. Hopper was a cheap method of extracting aluminum from common clay; but, unfortunately, his process acts upon the silicon in the clay in exactly the same manner as the aluminum, and an alloy is formed of the two metals which is brittle and unfit for the uses to which aluminum is applied in the arts, so that there is more or less question about the merits of Mr. Hopper's find. Inasmuch as his black-sand invention is guaranteed to extract $10 per ton from sand which assays $5, we also find some difficulty in the way of commending Mr. Hopper's other discovery to the favorable consideration of the investing public. On the whole, it will probably be some time before his inventions meet with unreserved public commendation.

IN his discussion of the silver question, Senator Teller of Colorado pointed out in a very plain and convincing manner that the Sherman law has not been responsible for the present crisis. The Senator cited the instances of the Northern Pacific Railroad, which recently collapsed with $250,000,000 indebtedness, and of other corporations whose stock was enormously watered, and which were tottering under the weight of their obligations. "Don't you think," asked the Colorado Senator, "that when a great corporation like the Northern Pacific collapses, and is left with a debt so great that its most enthusiastic friends cannot hope it can ever pay, finances in this country might be disturbed as well as in Europe?" This distnrbance does not come from the Sherman law. It comes from the misconduct of officials.

The Coming Miners' Convention.

A call has been issued for the annual convention of the State Miners' Association, to be held in this city October 9, 1893. In his address to the miners President Neff very fully states the purposes of the session, reviews various matters demanding attention, and points out the urgent necessity of vigorous and forceful action. There never was a time when it was more important for miners of the State to get together and consider subjects affecting their welfare. The industry has recently shaken off the lethargy with which it had been seized for a number of years, and, if properly encouraged, it is now in fair way to become the lusty and powerful giant it once was. The drift of legislation and judicial decision has of recent years been uniformly against the miner; but he has now the spirit and strength to stem the tide and to turn the current in his own direction. And the coming convention can do much to assist him in his effort.

One of the important things to be considered by the convention is the attitude of Congress toward hydraulic mining. The State of California has made a conditional appropriation of $250,000 for the construction of restraining dams at the mouths of unnavigable streams emptying into the Sacramento and San Joaquin systems; and it is desired to impress upon Congress the justice and necessity of making a sufficient additional appropriation ($500,000) to carry out the intent of the Caminetti act. That the inclination of Congress seems to be favorable is shown by the fact that a committee report at the last session was secured for an appropriation of $450,000, but, in its ardor for economy, the House struck the item out. The $250,000 State appropriation is an earnest of the faith and intentions of California in the matter, and it ought to be of great assistance in securing affirmative action by the coming Congress. The convention should present the matter to Congress in a proper manner.

The Stewart mining bill, which has been urged upon Congress at several sessions, and which, from a variety of causes, has failed to pass, is unfortunately still alive, and it is necessary for the miners to continue to urge their objections to several of its provisions. It threatens the welfare of the drift miners of California in a very serious manner, and it delegates to the Commissioner of the General Land Office unusnal and extraordinary powers in the adjudication of contests as to the mineral or agricultural character of land. It declares that the "testimony and proofs may be taken under such regulations and notice as the Commissioner of the General Land Office may decide." It is desirable to retain the present provisions of the law regarding notice and taking of testimony in contests. Under the proposed law the authority of the land department in determining contests would be practically limitless. The miners have no reason to be satisfied with the record of the land department in the past. The Stewart bill in this respect is a promise that its policy will, to say the least, not be different in future.

Altogether, the convention will be a notable and very important one. Representatives should be present from all the mining districts of California. Their time will be well spent.

Silver Still in the Senate.

The debate over the silver question in the United States Senate has occupied another week, but the senators have as yet shown little disposition to get down to the serious business of voting. Senator Voorhees, the champion of repeal, on Wednesday proposed that a vote be taken one week from to-day (Saturday) solemnly assuring the senators that his proposition was made "in the utmost good faith and respect for every senator and the Senate itself." In other words, the senator was simply rubbing a little oil on the gag before it was applied to the senatorial mouth. The silver men objected to the proposal and it went over. While the silver men have shown little disposition to filibuster, it is evidently their policy to get a full and free discussion of the matter. The longer the delay the better the chances of a compromise. The advocates of repeal are not strong enongh to apply cloture, and must wait until the debate has exhausted itself, or until the silver men are willing to bring the question to issue.

The latest compromise proposition comes from Senator Faulkner, of West Virginia. It is in the nature of an amendment to the Sherman repeal bill. It will provide for the monthly coinage of $3,000,000 of silver till the aggregate circulation of silver reaches $800,000,000, and will call for the retirement of all bills under $20 denomination. Faulkner says he has not yet canvassed the Senate upon the amendment, and is not prepared to say whether he can command sufficient votes for its acceptance. However, he has received many assurances of good will toward the principles suggested by the amendment from members who express their willingness to support the measure if satisfactory in detail. It is believed the great bulk of the silver advocates, Republicans and Democrats alike, will support the amendment if they find it impossible to get anything more favorable.

To Catch Unwary Investors.

Mining is a business which, conducted on correct principles, yields as safe and remunerative returns as any other business. Enterprises which honestly undertake the development of mineral properties are therefore entitled to the full credit and confidence of the public. But it is unfortunately true that the experience of many Eastern and other investors has been so disastrous that a certain amount of suspicion attaches to most new mining companies which invite outside capital to investment; and it must be admitted that careful scrutiny into such concerns is often both just and necessary.

Investigation will generally disclose their true nature. Cases are exceptional where it is found that mining enterprises have no merit, or, worse, are conceived in frand. Nevertheless, concerns with circus-poster promise and postage-stamp performance are not altogether a thing of the past, and probably they will not be until wickedness of all kinds is at a discount and the millenium has passed the three-quarter pole into the home-stretch.

The latest instance of the formation of one of these balloon concerns is "The Igo Consolidated Mining and Milling Company," incorporated under the laws of Illinois, with a capital stock of $2,000,000, declared to be fully paid up and non-assessable. The property of the Igo is by its gaudy prospectus said to consist of 11 mines and a five-acre mill site in South Fork mining district, Shasta county, California. N. Dunham, a resident of Igo, writes to the Shasta county *Democrat*, declaring that the mines "claimed by this company that are of any known value are owned and now being worked by other parties, and others of the claims are in litigation. In fact, the only mine of real merit claimed by this corporation was declared by a court of justice to belong to other parties 40 days before this incorporation existed, and the principal promoter and getter up of the company, W. W. Robinson, was fully aware of this fact when it was put into this incorporation." All these things, says Mr. Dunham, can be fully verified at Igo.

The prospectus of the Igo Consolidated Mining and Milling Company bears the evidence of false pretense on its face, in the claim that the capital stock of $2,000,000 (non-assessable) is fully paid up. It would be exceedingly difficult in these times to float any enterprise, however large, important and meritorious, by successfully enlisting that amount of cash capital.

IT is somewhat refreshing to find the Marysville *Democrat*, in a recent issue, urging the business men of that city to assist the people of the upper end of the county to open up mines and thus restore "to the natural channels of trade a considerable business which has been lost to Marysville through an unfortunate condition of affairs, the result of hydraulic mining." Doubtless the *Democrat* means that the trade has been lost by the cessation of hydraulic mining. No class of people, except the miners, have suffered more from the stoppage of hydraulic mining than the farmers themselves, and they have found it out through an object lesson that touches them in a very tender spot—the pocket. The local market for fruit and vegetable produce in the agricultural-mining regions has been paralyzed. The food supplies of the miners were largely secured from the farmers, who got good cash prices for them. This source of revenue has been almost wholly shut off, and, until mining is resumed, it will be felt more and more severely. It is true that the "boom" in fruit-culture for the past few years, and the profits obtainable in the East, have to some extent obscured the importance of a home market for these and other products. But the production of fruit is now so great that the business is down to a bread-and-butter basis, and much fruit must be sold at home or go to waste. The farmer wants the miner for a customer. He is learning that he must have him, and he is saying so, too.

THERE is a better feeling in the silver-producing districts than for some time, despite the probability of unfavorable legislation by Congress. Reports come from Montana that work will be resumed in the Anaconda copper mine, despite the extremely low price of copper—unequaled in the history of the metal. Two hundred and fifty men are to be put to work at once. Other mines are gradually increasing their forces. In the Cœur d'Alene, the recent rise of lead has encouraged mine-owners to announce that work will be resumed. The Bunker Hill & Snllivan mine still adheres to its proposal to put 250 men at work when they will accept $3 per day. In Colorado the rise in lead will doubtless also have a favorable effect.

Gold and Silver in 1893.

The very nearly complete cessation of silver-mining operations in the important districts of the United States, and the increased activity in the gold regions, offers a subject for interesting speculation to all who have followed the history of the two metals in recent years. In the past twenty years the silver production of the United States has increased steadily and with great rapidity—from $35,750,000 (coining value) in 1873 to $74,989,900 in 1892 The production of gold has shown a slight falling off, but in the past ten years its uniformity has been remarkable. The great development of silver properties, the opening of new and extensive fields, and the improvement of methods of reduction for a long time appeared to indicate that the limit of profitable production was yet very far in the future; but a variety of causes, some natural, others artificial, not necessary to recite here, broke down the market and reduced the price greatly below the average cost of mining and milling; so that for the first time in the history of the industry the swelling flood of its prosperity has been severely checked and the output enormously restricted. During 1892, the principal producing States contributed to the world's wealth of gold and silver the following:

	Gold.	Silver.
Alaska	$ 1,080,446	$ 10,030
Arizona	1,177,577	1,373,375
California	12,571,900	463,602
Colorado	5,589,021	31,478,972
Idaho	1,721,364	4 091,176
Montana	2,965,572	22,503,555
Nevada	1,571,500	2,901,200
New Mexico	959,176	1,390,856
Oregon	1,491,781	64,080
South Dakota	3,942,495	68,767
Utah	660,175	10.036,050
All Others	749,570	674.143
Totals	$31,431,577	$75,055,806

The output for the past ten years has been as follows:

	Gold.	Silver.
1883	$30,000,000	$46,200,000
1884	30,800,000	48,800,000
1885	31,800,000	51,600,000
1886	35,000,000	51,000,000
1887	33,000,000	53,350,000
1888	33,175,000	59,195,000
1889	32,800,000	64.646,000
1890	32,845 900	70,465.000
1891	33,175,000	75,417,000
1892	*33,000,000	74,989,900

*The actual production was reported by agents of the Mint to be $31,431,577, but the director of the Mint reduced the aggregate in his official estimate. The same discrepancy exists in the silver tables.

Obviously, it is not possible to make an accurate estimate of the relative production of the two metals for 1893; but, roughly speaking, it may be said that the gold output will be about the same, while silver will be cut down 50 per cent, more or less. The shutting down of silver mines has affected the incidental gold production, but in the gold States the increase will be nearly, if not quite, sufficient to compensate for the loss. The situation in the various States may be generally set down as follows:

In Arizona the incidental gold output is very small, and the total gold output for 1893 will doubtless show an increase. There will be a material falling off in silver.

The general activity of gold-mining in California, the resumption of work in old mines, the opening up of new, the repair of old works and the construction of new, will hardly be felt to their fullest extent until next year. But the gold output will nevertheless be increased several million dollars.

In Colorado the bulk of gold comes from Boulder, Gilpin and El Paso counties, which are almost exclusively gold producers. The incidental gold output (about $2,500,000), in connection with silver, will show a heavy falling off. Though there is great activity in the gold fields, the total production will hardly come up to 1892. It is impossible to make a satisfactory estimate of the probable silver yield. The falling off will be more than one-half.

Idaho will probably show a falling off in both gold and silver—very heavy of the latter.

There will be a very material decrease in Montana's production of both gold and silver—perhaps 50 per cent of both.

Nevada will show a decrease of both gold and silver.

In Utah the falling off of silver will be heavy, with a material decrease of gold.

Oregon will increase her gold output, and so, probably, will Alaska. New Mexico, South Dakota and others may be expected to show no great changes.

It is doubtless true that more than half the producing silver mines of the United States are now idle; but it is likewise true that many of them were operated in the early months of 1893, so that the falling off in the latter months will be heavier than in the former. If conditions remain to the end of the year as they are at present, the average output may be broadly estimated at from 50 to 60 per cent of the yield for 1892, or from $35,000,000 to $40,000,000, coinage value ($1,2929 per ounce). The actual value will be much less. The average value of silver for 1892 was .875 per ounce.

A COMPANY has been formed at Grass Valley to develop a part of country hitherto untouched. It is the Eastern Star Gold and Silver Mining Company, backed by local capital. The location is about 3½ miles east of the city, easily accessible by wagon. There are four ledges all of good size, in slate, and bearing good rock. The indications are so favorable that the opening up of a valuable property is confidently predicted.

Mining and Civilization.

Historical data in regard to the progress of mining and metallurgy are worthy of more attention than is usually accorded to them. Mining has been the great civilizer of the human race. The tribes of the early ages wandered about or lived in caves, subsisting mainly upon roots and nuts until they began to delve in the earth for its hidden treasures. From that time the human mind began to be enlightened, and man was gradually lifted out of his savage state into the early dawn of civilization. There was no progress so long as shells and other trifles constituted the only medium of exchange for commodities. It was only with mining, which led to the introduction of money, that progress was possible. That money is, and ever has been, the mother of all other agents of civilization and progress no one now disputes. But the miner had to be the forerunner of money. In his labors the miner has endured more hardships and dangerr, and toiled more severely for mankind than any other toiler.

When we look back over the world's history we find that special periods of intellectual and commercial activity tally closely with periods of special activity in the progress of mining and metallurgy. We find both in ancient and modern times there has existed a constant ratio between the elements of general progress in civilization and the amount and variety of mineral wealth drawn from the earth.

The commerce and power of the Phœnicians could never have been built up as it was had not the miner first dug the means for such development from the bowels of the earth. Their cities—Tyre and Sidon—accumulated their wealth and attained their magnificence mainly from the commerce which was built up by their traffic in gold, silver and tin—the latter then accounted a precious metal—which was exchanged with other nations for that which was needed in Phœnicia.

The Greeks also reached the height of their glory through the products of mines obtained, however, from their neighbors, the Phœnicians. Their efforts were mainly expended in working the metals, in which labor they excelled all others, as is sufficiently shown by Homer and other writers of antiquity.

Rome secured its superior ascendency from its control of nearly all the mines of the then known world. Spain furnished her with gold, silver, copper and iron, while Britain supplied her with tin from the mines first opened by the Phœnicians. Rome thus became the ruler of nations and the grand treasury of the wealth of the world; but, as much of that treasure was derived from the plunder of other nations, it was ill-gotten wealth, and finally became the millstone which dragged its possessor down to destruction.

The golden era of Egypt found its climax during the period of the most abundant development of her mineral resources. The treasures thus unearthed were devoted to the building of her wonderful cities and her still more wonderful and more enduring monuments.

The influx of the precious metals into Palestine through the commercial ventures of Solomon and Hiram of Tyre down the Red sea to the ancient Ophir, wherever that might have been, brought about the golden era of the Hebrew people.

The discovery of America and the consequent influx of the precious metals into western Europe, gave a new impulse to the nations of Europe, who were just awakening from the sleep of the dark ages.

It is within the memory of those now living, what a wonderful impulse was given to the industrial progress of the entire world by the almost simultaneous discovery of gold in California, Australia and South Africa.

LIEUTENANT C. C. GILLETTE, assigned by Secretary of War Lamont to duty in connection with the California Debris Commission, has arrived from the East, and his headquarters are established at room 92, Flood building, San Francisco. It is expected that Lieutenant Gillette will be practically the executive officer of the commission. Its members are Government officers who have many other things to do, and it is impossible for them to devote their whole time to their new work. The inspection of mines and of restraining works erected, or proposed to be erected, by an applicant for license to mine, will probably be made principally by Lieutenant Gillette, who is a competent engineer, thoroughly qualified by education and experience to perform that duty. His assignment to this field will materially expedite the work of the commission.

Tailings.

THE German mine at Washington, Nevada county, has been started up.

JACK ROSS is now superintendent of the Blackbird mine, Central District, Nevada.

IT is expected that the old Sneath & Clay mine at Nevada City will shortly start to work.

THE W. Y. O. D. mine at Grass Valley has declared its sixteenth dividend of ten cents per share, payable Sept. 15th.

THERE are said to be less than 500 miners employed in the State of Nevada, and 300 of them are employed at present on the Comstock.

THE Ganthier mill, at Grass Valley, after a long period of idleness, has again resumed the crushing of ore under the management of Thomas Kelleher.

THOMAS RHODES, a mining man, committed suicide at Los Angeles, Monday. Financial troubles are given as the cause. He once cleaned up $150,000 in Lower California.

REPRESENTATIVA MAGUIRE has presented in the House, at Washington, a monster petition from many parts of California in favor of free coinage of silver at the ratio of 16 to 1.

AFTER being shut down for a number of weeks the Brunswick mine, at Grass Valley, has started up. Superintendent Hawley, who has been in the East, will return soon and resume active charge.

THE Red Cloud mine, in Mariposa county, has been compelled to suspend operations. It lost a large sum of money by the failure of an Eastern bank. It is hoped and believed the suspension is only temporary.

THE Nevada City *Herald* learns that the Mayflower mine at Canada Hill had a clean-up last week which yielded its owners a dividend of several hundred dollars each. W. H. and Robert Martin, the foundrymen of Nevada City, are the principal owners. The Mayflower is a new mine.

ALVA GOULD, one of the earliest Comstock pioneers, and one after whom the Gould & Curry mine was named, was removed to the Washoe County Hospital, Nevada, last week, suffering from fever. He has made his living of late years peddling fruit at trains, and overland passengers will remember the kindly face of the decrepit old man with a basket of fruit on his arm ready to serve them.

THE Nevada *Transcript* of Sept. 13th says: "The Eureka Lake Water and Mining Company at Columbia Hill will commence hydraulicking to-day, and the five acres which they have been granted a license to work, by the Government Debris Commissioners, will yield enough of the precious metal to pay (if the company was so disposed) all the real damage done to the valley lands since 1850."

THE great decline in the market value of mining plants in Utah has caused the representatives of insurance companies to withdraw from the mining camps of that Territory, and, it is hinted, to curtail risks on mining property and in mining camps throughout the silver-producing region of the far West. The insurance companies are said to be refusing to renew policies, at least on former terms.

THE new owners of the Bonanza mines at Harqua Hala have filed articles of incorporation of the Harqua Hala Arizona Mining Company, under the laws of Minnesota, with its general office at St. Paul. The incorporators are: A. Wertenweiler of St. Paul, Minn.; Francis Muir, Sorrey, Eng., and Henry Bratnober of San Francisco, Cal. The capital stock is $10,000, divided into 100 shares of $100 each.

FORBESTOWN, Butte county, now consists of three hotels, three general merchandise stores, four saloons and a brewery, besides fruit and confectionery stores, barber-shops, a drug store and photograph galleries, meat market, and several other smaller concerns. There are three large quartz properties being worked which have a total of 80 stamps and two large reduction works. The hills are full of prospectors, and several more ledges are being opened.

SUPERINTENDENT DAGGETT of the Mint has made the following appointments: A. C. Cuneo of Stockton, workman in the coiners' department; Franklin Trippe of Santa Cruz, silver refiner in the melters' and refiners' department; Fred Taylor of San Francisco, corroding-houses in the melters' and refiners' department; Edward J. Murphy of Del Norte county, workman in the coiners' department; George Johnstone of Nevada county, janitor in the assayer's department.

THERE is some talk of the resumption of operations by the big North Bloomfield gravel mine, in Nevada county. This mine, before being suppressed by the courts, employed from 150 to 200 men, paying them from $2.50 to $3 per day. From 1875 to 1877 the mines of this company produced nearly $4,000,000, while from January, 1876, to January, 1884, during which time the mine was worked as an open hydraulic, the output amounted to $2,000,000. In January, 1884, the mine was enjoined in the suit of Woodruff *vs.* the North Bloomfield Mining Company *et al.*

H. SMITH, a stockholder, has brought suit against the Hale & Norcross Mining Company to enjoin the directors from selling his stock because of his failure to pay an assessment of 50 cents per share. He also asks that the assessment be declared invalid and set aside. The directors sued are: N. T. Messer, H. Zadig, John W. Turggs, George R. Wells, C. H. Fish, W. S. Lyle and W. Edwards. They are alleged to have levied the assessment sought to be set aside in pursuance of a conspiracy designed to injure the plaintiff and other stockholders. As a matter of fact, it is claimed that the mines of the association have been conducted at a profit. The income, however, is said to have been misappropriated by the defendant directors.

A SYSTAMATIC effort is now being made in Butte county to prepare a creditable mineral exhibit for the Midwinter Fair. A. Ekman, writing to the Oroville *Mercury* on the subject, says: "The materials needed to get up a magnificent show are, first, the good-will and co-operation of every miner in the county; second, suitable samples of gold quartz, gold-bearing sulphurets in quartz and all economic minerals, and, lastly, some money. When all the mine-owners and prospectors in Butte county will contribute a block of their choice quartz of not less than ten inches square, or cube when it is possible, and some interesting and valuable specimens of their own collection, a most imposing display could be gotten up."

Certain Dissimilar Ooourrences of Gold-Bearing Quartz.

The following are extracts from a paper read by T. A. Rickard before the Colorado Scientific Society, Sept. 4, 1893:

Coincidence of the Pitch of an Ore Shoot with the Intersection of Lode and Country.—No feature of vein mining offers more perplexing problems than the uncertain behavior of ore shoots. Occasionally the evidence obtained from underground surveys indicates the pitch in a particular direction of the successive ore bodies of a particular mioe, but the deductions which are then made may prove as dangerous and delusive as they often are practically useful.

In a little mine among the Australian Alps there was afforded me a very strikiog illustration of the dependence of ore deposition upon the geological structure of the country rock. At the Shouldn't Wouder mioe, seven miles from Bright, Victoria, the country rock is of Upper Silurian age and consists of altered slates and sandstones having a vary-dip to the west and a strike 35° to 50° west of north. Tbough these rocks show the changes due to metamorphic action aod exhibit a well-developed cleavage, yet the bedding has not been obliterated. The lode of the mine is a quartz vein having a strike 28° southwest of north and a dip to the northeast of 75° to 78°. The width of the lode is 15 to 24 inches and consists of simple gold quartz containing a very small but varying percentage of pyrite. Occasional faults occur; these are called "heads" by the miners and have a throw to the left. The break which they cause is clean, and there is no difficulty in again picking up tbe lode beyond the fault.

The plane of the lode cuts across the bedding of the country rock, and the vein is therefore what is commonly called a "true fissure." The examination of the foot-wall shows that the bedding planes are marked by lines having a dip 42° south. While the foot-wall is more regular than the hanging, and indicates this feature best, yet the face of the latter carries lioes which correspood to those occurring on the opposite wall.

Tbe country has a dip 79° southwest and a strike 55° west of north. The line of intersection formed by the crossing of the planes of stratification and the lode fissure was found to make an angle of 42° south, as indicated by the foot-wall. Upon referring to the longitudinal section of the underground workings, it was found that this angle coincided wlth the pitch of the ore bodies as worked in the four successive levels of the mine.

At the Myrtle mine, a few miles farther south, there was the same corelation between the pitch of the ore bodies and the line of intersection of the wall of the lode with the bedding planes of the enclosing country. The stratification was distinct, the rocks consisting of altered, often very sillcious, slates of a gray to a gray-blue color. At the 700-foot level the couotry had a dip of 80° southwest aod a strike 46° west of north, while the vein dipped 70° northeast and had a strike 20° west of north. The quartz vein was 2½ to 3 feet wide. In the stopes above this level the pay ore was separated from the valueless qnartz by a small step due to the irregular fracture of two beds of slate of unequal hardness. The miners had considered this a small fault. It marked the lioe of intersection between lode plane and and country bedding.

This particular ore shoot was 85 feet long and of variable gold contents. The quartz contaioed a large proportion of included fragments of country rock, giving the ore a mottled appearance. The gold was fine, often forming a gilded mosaic upon the faces of the fractures.

In the different parts of the miue the changing dip of the country produced variatioos in the angle of the liues of intersectiou, which varied from 35° to 55° south. The general pitch of the ore hodies of the mine, as worked to a depth of 700 feet, was found to be 45° south.

* * * * *

Occurrenie of a Rich Pocket of Gold Ore at the Crossing of a Fault Plane.—The pockets or extremely rich patches of gold-bearing quartz which are found in certain lodes of the maio Californian gold belt, more particularly in Calaveras and Tuolumne counties, offer many points of interest. The gold is often so little intermixed with quartz as to resemble a nugget, differing, of course, from the latter in the absence of water-worn edges and by its more filiform, spongy structure. It was long supposed that no gold had been found in quartz reefs in pieces such as would explain the derivation of the larger nuggets by the degradation of pre-existing quartz lodes. In these pocket mines, nevertheless, there have been found occurrences of gold quite able to account for the largest nuggets which have yet been found in California. It must not be understood, however, that in making this statement of fact I would wish to uphold the origin of nuggets as due to purely mechanical agencies.

At the Rathgeb mine, near Sao Andreas, there was found one of these pockets. It may be premised that the maio lode of this mine has ao augite schist (a very beautiful rock io which the augite is porphyritically dissemioated) on the foot-wall, and a more compact and massive rock, approaching a diabase, on the hanging.

Tbe zone of oxidatioo has a depth of about 160 feet; below this the lode is large and poor, consisting of white massive quartz, but above the water level the vein is replaced by a oetwork of quartz seams of varying sizes. Those having a regular strike to the northwest represeot the main lode, while the smaller, more irregular cross veins may be considered as feeders. Where these veins intersect there have been found bunches of rich quartz containing gold io a coarse form. I will describe the mode of occurrence of the ricbest pocket which was fouod duriog my stay at the mioe.

At the 120-foot level (south) and about 150 feet from the shaft there were some old workings, and upon an examination of these there was noticed a small cross vein one-sixteenth of an inch thick, the red clay filling of which showed a great deal of free fine gold when washed in a pan. A miner, experienced in pocket hunting, was put to wnrk at this place. The small streak, while it was generally very "slim" in size, yet occasionally opened out into small lenticular openings, yielding a clay in which the gold was as the raisins in a pudding, though also mixed with quartz, some merely fragmentary. Each pocket yielded gold worth from one tn five hundred dollars. At length this cross vein widened to 6 or 8 inches and looked like an ordinary quartz lode of more than ordinary richness, but not up to pocket standard. The amount of red clay began to increase, it became daily more gold-bearing, and a rich discovery was hourly expected. It was duly found. The vein became faulted, and at the place of the fault there was a soft, spongy, wiry mass of gold and clay—more gold than clay. The first handful which I broke while yet the stope was obscure with powder smoke contained three ounces of gold. Within the next two hours that pocket gave us $3000 worth of gold, and in the days that followed it yielded over $20,000, obtained at an expense of less than $200. When it had been worked out it was easy to study its mode of occurrence. The veio had been faulted about its own width, namely, 10 inches, and along the recess so formed the nest of golden material was found. A few feet overhead the vein met with another cross vein which bounded its extent in that direction, while below it narrowed to the width of a knife blade.

The gold was spongy and accompanied hy a certain amount of quartz which filled the interspaces. The clay which covered the gold aod quartz was partly red ochreous material and partly a gray, gelatinous, silicious matter. The gold, when washed, sold for $18 per ounce. The quartz associated with it carried pitch blende (uraninite) in needle-shaped crystals, which, immediately adjacent to the gold, became yellow uranium ochre. The association of gold and uranium is uncommon.

* * * * *

In presenting the foregoing brief notes descriptive of certain ore occurrences in the gold-bearing veins of mining districts so widely separated, the writer has not aimed sn much to call attention to any new economic features in this special class of ore deposits, as to afford evidence nf the fact of the great variety of modes of occurrence of gold-bearing quartz, and to emphasize the consequent danger of attempting to take a theory applicable to one district and of applying it to another region far distant and of entirely dissimilar geological structure.

Foundry Notes.

THE Reno (Nev.) fonndry has made a cssting weigbing tbree tons, which the *Journal* says is "by far tbe largest ever made in Reoo."

IT is uuderstood that a cbain for tbe constrnction of a marine railway at Esquimalt, B. C., has been ordered at a Liverpool foundry.

THE Fulton Iron Works have just received a large order from the Western Sugar Refinery for coudeosers for their sogar paos and other appliances used at tbe refinery. Work is to begin at once.

REPRESENTATIVE CAMINETTI has iotrodoced in the Hoose, at Wasbington, a bill to provide for the establisbment of a gnn factory for finisbing and assembling of heavy ordnance at Benicia, at the cost of $1,000,000.

A NUMBER of Froe vanners have been recently porchased and placed in position io the mill at tbe Shakespeare mine, Forbestown, Butte coonty. Tbe mill has just heen enlarged from 10 stamps to 30, making 12 the nnmber of Frue vanners in use. Col. Hayward is now working the mill at its full capacity, and is taking a great deal of ore from the mine. A oovel feature of the Shakespeare mill is that the ore is worked both hy concentrators and by the Plattoer cblorination process. The ore is rebellious, and after croshiog aboot one-fonrth the total—the best in quality—is chlorinated and the remaiuder goes to the concentrators. The chlorination plant is ooe of the most complete in California. E. L. Montgomery is snperioteodent.

THE loug-delayed plate for the tnrrets of the Monterey and tbe armor plates for the great warship Oregon have commenced to arrive, the Union Iron Works Wednesday receiving the first two cars, contaioing one plate for each vessel. The torret armor for the Monterey is a stupendous piece of metal, elliptical in sbape, seven inches thick and about four feet wide. It weigbs ahout 24,000 poonds and was bronght on a specially-constrocted car of giant streogtb. It is expected that all of the plates needed to complete the Monterey and tbe Oregon will be received without further delay, and advices have been forwarded of further and continued shipment. The receipt of the armor plates for the Oregon insures an early lannch of that vessel, and the arrival of the tnrret armor for the Monterey indicates that the Government has determined to let tbe Union Iron Works complete that vessel, instead of permitting the work to be done at Mare Island, as thooght probable. The delay in the receipt of these loug-expected plates was cansed by the great Homestead strike, and the completion of botb vessels was greatly retarded thereby.

THE first of a notable shipment of steel rope for cable railways was started Esst on Wednesday by the California Wire Works. It was in partial fulfillmeot of an order placed with tbe wire works for the mannfactnre of 14 ropes, and the 13 others are to follow as soon as ready. Tbe initial cable is 21,000 feet long, 1¼ inch in diameter and weighs 55,000 ponnds; with the reel on wbich it is wonnd over 60,000. It was hauled from the works to the depot by 50 horses. The placing of this order in San Francisco is a high testimonial to the snperiority of the California Wire Works' steel cables. The St. Lonis cable railways made a thorongh investigation into the merits of the cables made by the local factory, with the resnlt that they ordered a snfficient snpply for two years. The cable roads of this city have had experience with cables made by varioos manofacturers, hot they all state that cables made here have dooe hetter service than any other maker. Tbe wonder is, in view of this fact, tbat any cables are ordered from the East or Europe. Chicago and other Eastern cities are negotiating with the California Wire Works for railway cables.

Annual Convention of California Miners' Assooiation.

TO THE EDITOR:—On Monday, the ninth day of October, at 10 o'clock, A. M., in Pioneer hall, Fourth street, near Market, in this city, will be held the Annual Convention of the California Miners' Association.

Tbe miners of California are to-day in a better position than they have been for many years. Public sentiment is favorable to their interest, and gold mines are in demand. There is a desire to see the hydraulic mining industry become again productive, and to see the quartz "prospects" developed into mines. Everybody wants gold, and we have more of it in California than any other State in the Union. All that is now necessary is capital to develop our properties.

The last convention of the miners of California indorsed a bill, then pending in Congress, which was subsequently amended and became a law, with some unsatisfactory features. However, it is found from the proceedings before the California Debris Commission that some of the hydraulic mines can resume operations under this law. The State of Callfornia has already appropriated $250,000 to construct dams to restrain the debris in the rivers, contingent upon the Government giving a like amount. It should be our endeavor to impress this upon Congress, as with these sums devoted to said purpose, the gold yield from these mines would be greatly increased.

The people of the State of California begin tn understand that a grave mistake was made when the hydraulic mining industry was stopped. They have felt the effect of the decline in gold production very seriously, and will be glad to see the yield again increased. The opportunity is before us to show by our numerical strength that we are in earnest in our effort to double the gnld yield of this State. So productive an industry merits recognition and will receive it when the conditions are properly understood.

For several cnnsecutive sessions a measure has been introduced in Congress, but never passed, which merits the attention of miners. It is known as the Stewart Mining Bill, and seeks to amend the present laws in several important particulars. Should this bill be again introduced, as appears probable, there are several features which should be carefully considered hy the working miners of this State. The quantity of drift-mining ground patentable, under its provisions, is so small that it would not pay to run the long bedrock tunnels necessary to open the claims. The passage of this bill would be a serious blow to the drift miners of tbis State. It also seriously affects those prospecting for petroleum in California. The originator of this measure should have his attention called to the objectionable points.

Another matter which has never received attention at the hands of the California Miners' Association ls the perversion of the mining laws by the "rulings," so called, of the Interior Department. In some instances the law is practically nullified, and it is much more difficult for a miner to obtain title to mineral ground than its original laws intended.

The attention of Congress should be called to these unfavorable features of Department Rulings through which the prerogatives of Coogress are being usurped.

It is to be hoped that there will be a full attendaoce of delegates from the county organizations, at the couvention in San Francisco. Delegates are urged, if they have any measures to present, to bave them prepared in writing, in order that they may be promptly considered.

County organizations are reminded that funds are necessary to continue the work so well commenced, and should endeavor to assist the State Association as far as possible in this respect. J. H. NEFF, Pres.

Headquarters, Room 2, Ninth Floor, Mills Building.

Mr. W. C. Ralston, secretary of the State Miners' Association, states that the prospect now is that the attendance at the convention will be quite as large, if not larger, than at any previous session. Miners everywhere are manifestiog great interest in the convention and they realize fully that it is important for them to take some definite action looking to their welfare. "The purposes of the convention are clearly set forth in the call," said Mr. Ralston to a representative of the PRESS. "The three vital things which the miners must consider and act upon are the Stewart Mining bill, the rulings of the Interior Department, and hydraulic mining. Either of the three affects the future of the miner in a very serious manner; and all together make it necessary for concerted and decisive action to be taken. I have received advices that various mining counties are preparing to send delegations to the convention, and I think it safe to expect that Pioneer hall will be crowded to its utmost capacity."

THE house (Wilson) bill for repeal of the purchase clause of the Sherman law is now under consideration by the Senate. It is expected that when a vote is reached, the Voorhees bill, with substantially the same provisions, but declaring also for bimetallism, will be substituted.

The Broken Hill Silver Output.

It is a notable fact that, despite the stagnation of the silver industry, there has been no cessation of operations in the great Broken Hill properties in Australia. Unusual attention, therefore, attaches to the publication of the semi-annual statement of the Broken Hill Proprietary Company, which produces three-fourths of the total silver output of Australia and is the largest producing silver mine in the world. It has paid enormous dividends, and there appears to be no intention of suspeoding operations despite the adverse conditions of the market. For the half-year ending May 31, 1893, the product was as follows:

Silver	5,972,194 ozs.
Lead	21,952 tons.
Copper	408 tons.

The average value of each ton of ore produced during the half-year was £4 16s; the cost of treating that ton of ore was £2 18s 10d, the net profit being £1 17s 2d. Each ton of ore which gave that return contained 28·84 oz. of siver and 10.42 per cent of lead, while the price obtained for the silver was a fraction under 3s 5½d per ounce fine, while for lead the average price obtained £11 0s 3d per ton. In comparison with the return obtained during previous half-years these figures do not contrast very satisfactorily, as since 1890 the average yield of silver per ton has decreased from 40 to 31 ozs. in 1892 and 28 in 1893, while the percentage of lead has fallen from 18 per cent in 1890 to 13.53 in 1892 and 10.42 in 1893. To find the explanation for this decrease reference must be made to the last report, in which Manager Howell stated his determination not to draw so extensively as had been the practice heretofore on his reserves of rich ore, but to average them with low-grade material with the view to enabling the latter to be treated profitaly. As the outcome of that policy very large quantities of low and medium-grade ores have been smelted; but the output of silver has far exceeded that of any previous six months, when reliance was placed in the better class of ores. While dealiog with the question of the output of the mine, attention may be directed to the tremendous yield obtained since the property was first opened up in 1885. No less than 44,794,847 ounces of silver have been won and 183,332 tons of lead obtained. This vast output has added wonderfully to the wealth of Australia. The future of the property depends largely on the solution of the sulphide problem. Experiments are being conducted, but they have not been successful, and it seems that after all old-time methods will have to be utilized to render valuable the immense deposits of sulphides which await handling. Mr. Howell appareotly intends to rely on the hyposulphite of soda treatment, which can be worked cheaply and easily. Concerning the contract system, in vogue at the mine, Manager Howell has to say:

The system of stoping ore by contract, or paying by results, is working very satisfactorily and is proving of great benefit to both the men and the company. Nearly all our mining, both underground aod on surface, is now carried througb by contract per cubic yard or at per set of timbers. During the past half-year, the contractors underground have put in place 12,096 square sets of timber, or equal to about 5,800,000 superficial feet at a cost of £40,945 or equal to £3 7s. 8d. per set for mining the ore and putting the timbers in place; the ore output from a space contained by a square set of timbers averages about 13 tons. Shafts have been sunk to an extent of 775 feet at a cost of £2585, or £3 5s. 2d. per foot. Drives and crosscuts have been run 2596 feet in length at a total cost of £3586, or £1 7s. 7d. per foot. Winzes and upraises have been sunk and put up to the extent of 308 feet at a total cost of £596, or at the rate of £1 18s. 8d. per foot, and all this work has been done on contract, the figures given heing labor only. The average number of men employed underground for the half-year ending May 31, 1892 was 1543; the average number employed for the like period in 1893 is 943, or 600 men less engaged at present. I have drawn the comparison between the half-year ending May 1892 and the one just expiring for the reason that during those periods work was in full swing, whereas the intervening half-year's work was interferred with owing to the strike. With these 600 fewer men we have during the past six months extracted 22,064 more tons of ore than we did with the 1543 men last year, and I have gone into figures most carefully and exactly, taking into account the ore on hand at the beginning of the six months, that which came from the surface workings and open cuts, and from everywhere but undergronnd. I can therefore say with confidence that we have extracted over 22,000 tons more of ore, with just under 40 per cent less men. We do not wish it, however, to be understood that a daily average saviog of the wages of 600 men has been made by the change in the system of working, for the men are making much better wages working on contract than under the old system of day's pay.

The amount of dividends paid by the Broken Hill Proprietary Co. since 1885 has been in the neighborhood of £6,500,000 (over $30,000,000). The capital stock is £384,000, in 960,000 shares of 8 shillings each.

An Immense Product.—Manager Howell gives the following detailed statement of ores treated: During the half-year we have treated 230,463 tons of ore, producing 408 tons of copper, 21,952 tons of lead, and 5,972,194 ounces of silver, as per statement following:

PLANT.	Ore Treated	Copper Matte.	PRODUCT. Copper.	Lead.	Silver.
Smelting—	Tons.	Tons.	Tons.	Tons.	Ounces.
Mine Furnaces	153,147	.....	.....	17,741	4,292,627
		772	311	156	90,662
Port Pirie Smelting Works	38,615	.....	.....	3,375	953,291
		214	97	63	39,107
Port Pirie Refinery Furnace	5,906	.....	.....	575	258,008
Dry Creek, ore sold to Aust. Smelting Co.	951	.....	.....	42	32,779
	198,709	.....	.....	.....	.....
Less Flue Dust	2,048	.....	.....	.....	.....
	196,661	986	408	21,952	5,665,874
Amalgamating	12,697	.....	.....	.....	292,179
Leaching — Silver contents of concentrator tailings leached during previous half-year	.....	.....	.....	.....	14,141
Concentrating— Tons. Crude ore passed through mill 27,884	.....	.....	.....	.....	.....
Producing—Concentrates. 6,779 (Which are included in ore treated at mine furnaces above.)	.....	.....	.....	.....	.....
And Tailings 21,105 (Which must be included in ore treated.)	21,105	.....	.....	.....	.....
27,884	.....	.....	.....	.....	.....
Grand total for half-year	230,463	986	408	21,952	*5,972,194

*Equal to 229,700 ounces per week.

Copper Smelting in Montana.

Great improvements have been made in the smelting of copper in the past ten years, and these are the result, in a great measure, of the experience of Montana metallurgists, writes H. M. Beadle of Helena, to the Montana *Mining Area*.

The Michigan copper mines were the first large producers of copper. There the metal is native, and finely disseminated through the rock. To get it out it is necessary to crush the ore very fine, aod smelt it. The metal needs no porifying, the only foreign element in it being a small percentage of silver. The cost of reducing the metal is very little, and the process simple.

Not so with the Montana ores. These are mostly in combination with sulphur and iron, with small quantities of the ores of zinc, arsenic, antimony, or combination of all of them. The ore occurs generally in larger or smaller bunches in the rock, and as it is much softer than the rock, crushing the rock even coarsely reduces much of the ore into powder, producing slimes, some of which is sure to be carried off and lost. The richer the ore is, the greater is the loss from slimes. In pulverizing such ore finely, to prevent loss, cisterns and vats have to be prepared to settle and collect it, and in spite of everything some of the rich ore is lost. Experience has taught metallurgists to avoid making slimes as much as possible.

Sulphur ore was formerly desulphurized in furnaces operated by hand. This method was tedious and expensive, and prevented any reduction of large quantities of ore, such as we now see in the large smelters of the State. There have been many kinds of furnaces invented for the desulphurization of ores. The O'Hara furnace was one that gave great promise to the metallurgist, bnt as first built it was too costly to operate. Mr. Allen, superintendent of the reduction works of the Butte and Boston Company, Butte, improved the machinery in snch a way as to make it one of the cheapest and most effective calciners that has ever been invented. The Allen-O'Hara will treat from 40 to 60 tons of ore a day, according to the amount of sulphur in the ore, taking out all but from five to six per cent of the sulphur, requiring the labor of only two men to take care of it—one to charge and one to fire—making the cost of calcining the ore in the Allen-O'Hara furnaces in the smelter of the Montana Ore Purchasing Company of Butte (locally known as the Meinze smelter), 62 cents a ton.

The Parrot smelter in Butte was the first to use the Bessemer furnace for converting matte into copper. Since that time it has come ioto common use in the copper refineries. It is used now in the Anaconda smelter, and in the smelter of the Boston and Montana Company at Great Falls. It will also be used at an early day in the Heinze smelter at Butte.

The refining of copper by electricity is a modern method. Copper plating by electricity has long been known, and on the same principle copper is refioed by electricity. But to do it cheaply required the invention of a dynamo of great power, and an extensive plant. There have been many improvements in the process since it was first used a few years ago. The cost now is about one cent a pound, bnt this will no doubt be reduced in the next few years. By this method all the gold and silver is saved and the copper is as pure as it can be made.

The amount of copper ore in Butte mines has been a matter of some speculation in the newspapers. Large developments have been made in the copper mines there to find out whether or not the ore would justify the erection of large smelters. I am credibly informed that in the Anaconda alone there is enough ore in sight to yield 3000 tons a day for 12 years. In the Mountain Tiew the present force of miners could be worked for five years taking out the ore in the parts of the mine already developed. The other mines show equally well as far as developed, and the probability is that the copper mines of Butte are practically inexhaustible.

Origin of Mountain Ranges.

[Abstract of paper read by Professor Joseph Le Conte, of California, before the American Association for the Advancement of Science, Milwaukee, Wisconsin.]

Mountains are focal points of geologic interest and theaters of intense igneous, aqueons and eruptive agencies. Their strata vary in thickness from 10,000 to 50,000 feet at the crest (allowing for erosion), but slope away with diminishing thickness until they vanish in the valleys and plains. Their component materials are fragments of rock, coarse gravels and sands, and their huge mass rises in folded structure above the general surface of the globe. Sometimes, as in the Uinta mountains, there is but a single enormous fold; and again there is fold upon fold; and yet again there is occasionally great complexity, the strata being thrust under and over in a vast fan like form. There are also sinclines and anticlines, which are often greatly oppressed, as in the Appalachian range, where 19 have been counted in a distance of 65 miles. Mountain strata are not equally affected by cleavage, some seeming to be very solid, while in the case of others the whole mountain appears to be cleavage from top to bottom. The earth wave sometimes breaks with surprising abruptness, and again it slopes away very gently.

Many theories have been offered in explanation of these phenomena. Bare facts are not science. Facts must be grouped and systematized. But as this work goes on, it is liable to grow daring and speculative, until it is necessary to demand a careful discrimination between what may be styled formal and casnal theories. It is agreed that mountains were originated by a process of horizontal mashing and vertical uplifting of the earth's crust. But what caused this mashing and uplifting? A true formal theory must advance gradually. Mountains are born of sea-margin deposits. We find by observation that existing offshore deposits are coarse at the top, shading down to fine by the same law as that marked in the structure of mountains. But the enormous mountaioous deposits would have been possible only where there was a corresponding subsidence of sea bottom. The earth sinks by loading and rises by unloading. Of this the Colorado plateau furnishes an illustration. It was originally 20,000 feet high, but 12,000 feet have been removed by erosion, which has caused the remaining 8000 feet to rise above the general level. It may be regarded as now proved that the cosmic behavior of the earth is that of a rigid solid. A solid globe of glass, six feet in diameter, will change shape by the pressure of its own weight. The earth does the same. But as the earth is not homogeneous, its radial contraction will be ridges. The contraction theory assumes that the earth was once an incandescent ball, now cooling; and this cooling compels yielding along its lines of weakness. This is known abroad as the "American theory," and the author of this address was its originator. In conclusion, Prof. Le Conte said he was ready, if need be, to sacrifice "the child of his brain," but did not really think it necessary. He considered and refuted objections; and he finally returned to the contraction theory, not as demonstrated beyond a doubt, but as furnishing the best working hypothesis yet offered.

Aluminium for Cages and Cables.

According to the *Moniteur Industriel*, the engineers of the principal coal mines of the north, in France, are studying the application of aluminium to the manufacture of cages, cables, etc. The difference in weight between aluminium and iron and steel, is considerable, and consequently the use of the former would increase the load capacity; on the other hand, the continuous lowering of the price of the metal renders its use possible. While it is possible that the use of aluminium as the material for certain mining apparatus or parts of apparatus is feasible, says the *Engineering Magazine*, it is doubtful whether in the present stage of aluminium metallurgy and manufacture, engineers would care to rely upon hoisting cables made of aluminium. Steel wire, either in round laid or flat woven cables, is an extremely reliable material, and one knows exactly what to expect of it; while in any event it will probably be a long time before aluminium manufactnre has so advanced that the same reliance can be placed upon it. Weight for weight, the steel cables would now be preferred. Accidents from their breakage are extremely rare. The increased diameter of equivalent aluminium cables would be a disadvantage, while their non-corrosibility would be in their favor.

Electricity in Mining.

The following is an abstract of a paper by F. O. Blackwell, presented before the American Institute of Mining Engioeers, at the Chicago meeting, which formed a part (Division C) of the International Engineering Congress, August, 1893:

It is roughly estimated that some 300 companies in the United States engaged in mining and the kindred arts now employ electricity in their operations. As all these plants have been installed within the last few years, it is evident that mining engineers have been quick to appreciate the great advantage of the use of electricity and adopt it for their many requirements.

Electricity tried under the arduous conditions of mining service has been shown to be peculiarly efficient, safe and reliable. It presents a system of the greatest simplicity, completeness and flexibility, permitting power from one source to be distributed in units of any desired size and for any purpose to the places where it can be employed to the greatest advantage, thereby securing the minimum consumption of power and expenditure of labor. With electricity there is neither friction, heat nor condensation. There is no leakage nor loss of power when not in use, which especially recommends it for intermittent work. It is not affected by heat or cold, and does not vitiate the air, as is the case with steam and compressed air. The rapid deterioratlon of timbering, a source of great expense in all mines, due to bad alr and heat, is, to a great extent, obviated. It has been urged against electricity that it increased the risk of fire. As a matter of fact it greatly decreases it, as the statistics of insurance companies testify. With proper safety devices and a system of concentric wlring it is practically impossible to start a fire from the current. To the engineer accustomed to speed indicators, pressure gauges and indicator cards, electrical methods of measurement seem particularly simple. The work being done by motor or generator at any instant can be read directly from a scale, and, if desired, automatically recorded. If necessary, motors can be controlled from a distance without difficulty.

The prime source of power is first to be considered. By conversion into electrical energy, water power, even at a considerable distaoce from the mine or mill, can be made valuable for all purposes, and steam power can be so located as to secure fuel and water cheaply. In addition to this, one large engine costs less, is more evenly loaded, requires less attendance, and is necessarily more efficient than a number of small ones. The introduction of electricity has in this way made important reductions in the cost of power, and there are cases in which it would be impossible to run without its help. An example is furnished by the Virginius mine at Ouray, Colo.; 300 H. P. is carried at 800 volts from a water power four miles distant. The cost of coal at the mine was formerly $18 per ton, which would amount, for the present plant, to about $80,000 per year, equaling the total cost of the electric plant. The item of fuel was a complete saving, the expense of operating the steam and electric plant being about the same in other respects. Several mines in Colorado are operated by electricity that could not be operated by steam on account of their situation on the face of precipitous cliffs, up which the transportatlon of water and fuel would be nearly impossible. The character of the country over which the power had to be carried for the Virginius plant is exceedingly rough. A portion is at an elevation of 12,700 ft. abcve sea level and well above the snow line.

Electric Generators.—Generators can now be obtained of any size and designed to run at any reasonable speed for belting or direct connection to engines or water-wheels. The largest generator in the world is now running at the power station of the intramural electric railway at the Columbian Exposition, in Chicago. It is of 2000 H. P., and directly connected to a compound condensing engine running at 75 revolutions. The electric generator is substantially the same as the motor, and both can be relied upon to give an efficiency of from 90 to 95 per cent.

Electric Power Transmission and Distribution.—The cost of copper with any fixed loss, power and distance varies inversely as the square of the voltage. It is, therefore, evident that as high a voltage as possible should be used if economy of copper alone is to be considered. When the power is carried over long distances the cost of copper is the largest item of expense. For general distrlbution, especially underground, convenience of insulation and handling are of more importance and cali for low potential. Nearly all the plants now in operation are supplied with current at 220 or 500 volts. There are a number, however, in which voltages of 1000 and over are in use; notably at the Poorman, Comstock and Calumet & Hecla mines. When bare wires are used, as for haulage, we are limited to a potential of 500 volts. Direct current generators are confined, by difficulties of construction, to potentials of less than 1500 volts. The distance over which direct current can be economically carried at this potential is about four miles. Above this point alternating currents are used.

The long distance transmissioo of power was first brought prominently before the public by the experimental line between Lauffen and Frankfort two years ago. The power of the Lauffen Falls was converted into electricity, transmitted 115 miles to the exposition at Frankfort, and there operated a number of motors. The distance was beyood the limits of commercial success, but it demonstrated the possibility of the system. To-day plants are in operation and transmitting current for light and power at Walla Walla, Hartford, Portland, Pomona and Telluride. The distances vary from 4 to 13 miles.

Alternating currents are particularly desirable on account of the ease with which the electrical pressure can be chaoged. By meaos of transformers without moving parts the high potential used for transmission is converted into low pressure for distribution. Alternating generators are wound for as high as 5000 volts, but it will probably be found better to limit them to 2500 volts. This potential permits of economical transmission for a distance of seven or eight miles. Above that distance step-up and step-down transformers are used. At present we do not care to go above 10,000 volts, which places the limit of about 25 miles to practical work. Alternating current motors possess nearly the same properties as those built for direct current. They have the advantage of being commutatorless, but cannot be sn heavily overloaded as a series wound direct current motor. They are, therefore, not as suitable for railway or hoisting service. Direct current can, however, be readily obtained from alternating by means of a rotary transformer which is a combined alternating motor and direct current generator. Motors have been designed to meet all the special requirements of mining work, and I will give a short description of some of the more recent applications.

Electric Haulage.—In no application of electricity except lighting has such success been met with as in the operation of railways. For underground haulage the ready control, compactness and freedom from smoke render it desirable, and already electric locomotives are in some 30 mines. I would call particular attention to the saving that can be effected in the size of entries. The electric locomotive is so designed as to occupy no more space than the car which it is to haul. The iocreased speed also permits a larger tonnage to be taken from the same outlet and with fewer turnouts, switches and cars. Locomotives are now to be obtained of any size and to operate on any track gauge not less than 18 ins. For mining haulage large sizes are not required; those now in use vary from 150 to 10 H. P., the most common size being 30 H. P. At Rock Springs, Wyo., there is in operatlon a locomotive of 80 H. P. It is operated by a single motor, geared to both axles, the connection to the axles, however, being made a flexible coupling, allowing the entire weight to be supported on springs. No part of the wheels is wider or higher than the wheels. The larger sizes of locomotives generally are constructed wlth one motor, and the smaller with two. All locomotives in use are controlled by rheostats, and the speed under load varies from 6 to 12 miles per hour.

Electric Hoisting.—Electric hoists are now largely in use and follow as nearly as possible the methods and construction approved for steam hoists. The governing mechanism is similar, rheostats replacing the steam controlling gear, and the brakes and clutches are the same. The rotary motion of the motor avoids the use of connecting rods entirely. If it is desired to lower by power the current can be admitted to the reversed motor. For small hoists used in winze and timber construction work, electricity is well adapted, the power connection being easily and quickly changed. The double drum hoist is designed for a double compartment shaft, and is furnished with post brakes and jaw clutches of the ordinary pattern. Special hoists for use underground are equipped with iron-clad motors so as to be thoroughly protected. An efficiency of from 50 to 60 per cent is usually obtained between the power taken by the motor and the foot-pounds hoisted.

Electric Pumping.—A number of large pumping plants are now in operation equipped with electric motors. It is necessary in order to turn the reciprocating motion of a plunger pump into rotary, to equip it with crank shaft and connecting rods. This at the same time insures a steady flow of water. Some difficulty ls experienced in cutting down the speed of electric pumps as is done with steam. The general practice has been to stop and start ln order to decrease the capacity. The best method, and one going largely into use, is to make the fields of such strength as to give the minimum speed desired, so that by decreasing the current in them the speed may be lncreased up to a maximum output. Where many pumps are in operation of nearly the same size, a convenient method of regulation is to throw the pumps into multiple series combinations with each other. They may also be controlled by varyiog the electromotive force supplied them from the generators. Rheostats answer well enough for small pumps. Triplex single-acting and duplex and trlplex double-acting all work well and give ao efficiency of over 70 per cent between the electric power taken by the motor and the water delivered by the pumps. If the lift is small, and the water contains much solid matter, centrifugal pumps may be used, but their efficiency is low. At the World's Columbian Exposition exhibit of the General Electric Co. is shown a Blake pump directly connected to a slow-speed multipolar motor of 100-horse power, requiring only one gear reduction. The capacity of the pump is 500 gallons at 500 feet head. A sinkiog pump of 120 gallons capacity to work against 200 feet head has been made, the motor and gearing being completely inclosed ln a cast steel case, and cannot be damaged by being flooded.

Electric Air Compressors.—The statements made above regarding hydraulic pumps apply equally well to air compressors, except that as air has not the inertia of water it can be automatically loaded and nnloaded without throwing any strains oo the mechanism, the motor running constantly at a fixed speed. A decided savlng of power can be effected by locating drill compressors near to the drills, and thus avoiding losses by leakage and shrinkage in the pipes.

Electric Drilling.—Although it has been a matter of great difficulty to make an electric percussion drill which would stand the continual abuse and hard usage to which air drills are subjected, they are at preseot in constant and snccessful operation. By care in designing the coils so as to make them fireproof and rigid they have been made to stand the strain. The drill consists of an outer iron pipe casing inside of and attached to whlch are two coils and the ratchet mechanism. The plunger, equipped wlth the ordinary chuck and rifle nut, is in the center of the coils. The coils are supplied with current alternately, and draw the plunger up and down at a speed fixed by the generator which supplies the current. Electric diamond drills are in use for drilling solid holes and for removing cores for prospecting purposes. For prospecting both above and underground the electric drill is particularly available, as it is extremely llght and compact, and temporary wires can be run to places where it would be difficult to carry steam pipes or boilers. A diamond prospecting drill with hoist and pump, driven by a 2¾ H. P. motor, will remove a 1⅜ core, and can drill 600 feet deep without difficulty.

Electric Lighting.—It has been found that much more work can be gotten from men by giving them better illumination. By avoiding the use of oil lamps and candles the air is left purer, and both time and power saved by doing work underground which would otherwise have to be done on the surface. Electric lighting also reduces the risk of accident by calling attention to conditions which would otherwise pass unnoticed. In gaseous mines, where many explosions have resulted from the reckless use of miners' lamps, electric lighting is invaluable.

The Improved Cyanide Process.

The MacArthur-Forrest (cyanide) process of ore reduction has undergone some improvement in the past eighteen months. As lt is now used on the Transvaal gold fields it is thus described:

This process is chemlcal and may be considered the only one on the Transvaal fields from which commercial results have so far been obtained. Cyanide ot potassium, which is the active principle in the process, was known to be capable of holding gold in solution, and was actually used for that purpose in the arts long before the MacArthur-Forrest process was heard of; but its application to extracting gold from ore, and subsequently precipitating it cheaply, is unquestionably a discovery of some importance, the validity of the pateot of which some have doubted, but which has been successfully maintained in the Supreme Federal Court of America. The process itself is sufficiently simple. A solution of cyanide of potassium is run into a vat contalning the ore, and is allowed thirty hours to percolate through the mass into a rough filter below, whence it is run through the boxes, which are filled with zinc shavings, so cut as to present the maximum amount of surface. Entering at the bottom of the boxes, the solution is forced up through the shavings, and enters at the bottom of the next box, through the whole series of which it passes. The gold, which, after it leaves the vat, is io the form of a cyanide, is precipitated on the zinc, which it gradually replaces,and then is easily recoverable by fusion in the form of fine metallic gold. The solution is available for further use by a slight addition of cyanogen. By allowing the ore to remain in the solution for thirty hours, it is claimed that 80 per cent of the assay value is recoverable; and that by increasing the lime and agitating the ore, anything between 98 and 99 per cent can be extracted. Obviously, whether the former or the latter method is the more advisable depends wholly on the value of the tailings or concentrates. In the case of 20-oz. concentrates, the 4 ounces which by the longer treatment would be recovered are worth the extra expenditure of time, while it is equally clear that in the case of 10-dwt. or 12-dwt. stuff, such a course would not be warranted.

Coming to the important question of expense, lt is claimed that the whole cost is less than that involved io the preliminary operation of roasting in any of the chlorination processes. No accurate calculation has been published, but it was stated at the meeting of the parent syndicate at Glasgow, sometime last year, that $2.25 per ton of tailings might be regarded as a fair estimate, and it is probable that that figure would not be exceeded in Johannesburg. This, however, only applies to low-grade tailings, the cost being regulated by the amount of cyanide used, which again is proportioned to the value of the ore (it now being shown that the capacity of cyanide for holding gold ln solution is strictly limited), so that in the case of rich concentrates the expense may be increased almost indefinitely. The process is at work in New Zealand, where the results have been favorable, and it is stated that it is the only treatment to which the tailings from one mine on the Thames gold-fields have been found to yield. So far, however, the South African patents, which are owned by the African Gold Recovery Company, have proved by far the most valuable of any. At the Robinson mine, work has been going on sioce the beginning of the year, and in the first five months 6266 ounces were returned.

The Big Bowman's Dam.

In course of a recent letter to the *Tidings* relative to the hydraulic mines of Nevada county Samuel Butler says of the North Bloomfield mine and the famous Bowman's dam: The North Bloomfield mine is situated three-fourths of a mile southwest of the town of North Bloomfield, at an altitude of 3150 feet, and is a consolidation of many claims, the whole aggregating 1535 acres. Of this area about one-fourth consists of auriferous gravel resting in ancient river channels. The general course of the main channel is northeast and southwest. The formation is black slate. The company has driven 10,135 feet of tunnels at a cost of $798,000. This company's water plant is next in size and extent to the South Yuba Canal Company. Operations were commenced on a large scale in 1872, in which year the now famous Bowman's dam was constructed. This reservoir, together with several smaller ones adjacent, will hold 450,000 miner's inches of water.

Bowman's dam is so well knowo to the majority of our pleasure seekers that an extended notice is unnecessary; but for the benefit of those unacquaioted with the topography of the country I may state that this famous dam is situated in a small valley in the mountains, on a tributary of the South Yuba river. At high-water mark the surface area of the reservoir is 502 acres. The dam, constructed in a narrow gorge at the outlet of the valley, is 425 feet long and 100 feet high, very substantially built of heavy cedar and tamarack.

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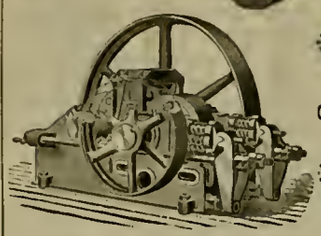

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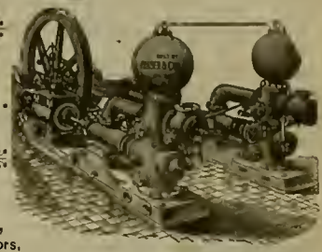

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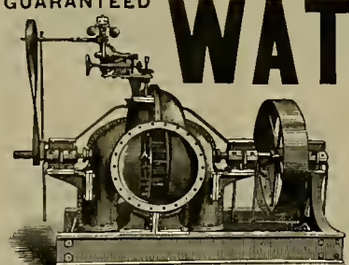

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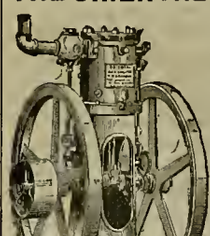

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Coal Endurance of United States Cruisers.

Ira N. Hollis, of the United States Navy, in the "Journal of the American Society of Naval Engineers," compares the actual consumption of coal on long voyages with the estimated radius of action in certain of the new ships. The coal used from port to port, includiog all expenditures, is slmply divided by the number of days in the voyage, and the endurance worked out from the result. The estimated radius of action of the Charleston, at ten knots, with 760 tnns of coal, 1200 I. H. P., was 7013 knots. On service it was found to be 4450 knots, with a clean bottom, and 2920 knots when the bottom was foul. It thus appears that, while the estimate was based upon a total consumption of 2 pounds per I. H. P. per hour, the consumption for all purposes amounted tn from 3.5 to 4.87 pounds, depending upon the condition or the bottom. At the most economical rate of speed, 8.8 knots, a clean bottom, fair weather and only absolutely necessary expenditure for ordinary purposes, the steaming radius is 5670 knots. This corresponds to about 4 pounds per I. H. P. per hour of the maln engines. The expenditure for galley, dynamo, distilliog, etc., was 2.9 tons per day. The calculated radius of action of the Yorktown at 8 knots, with 380 tons of coal, was 11,670 knots. On service, it proved to be 4800, which is at the rate of 3.75 pounds per I. H. P. per hour nf main engines. The steaming radius, with only absolutely necessary expenditure upon auxiliaries, is 5130 knots. This vessel is put down at 93 days' endurance in the theoretical calculations, whereas she could not keep the sea more than 25 days. The economical speed is found to be from one-half the maximum speed to one knot more than the half, varying somewhat with the coal expended for auxiliary purposes. The coal consumption is approxlmately 1 ton per 100 tons displacement per day for vessels below 5000 tons. The speed obtained with one screw is estimated at about three-fourths of that nbtained with both on the same consumption of coal. The steaming radius is given of a number of new ships, with a very full analysis of the expenditure of fuel for the different services on board.

About Steam Gauges.

Very few steam gauges are correct throughout the whole range of the scale, as they will vary more or less at different pressures. In testing a gauge to ascertain its correctness, it is always well to make the pressure at which steam is usually carried the most important point to he determined. A gauge may be all right at low pressure and not right at higher pressures, and the reverse may be found, especially with gauges that have been in use for some time. By many it is not considered advisable to use a gauge for recording pressnres as high as that shown on the dial, for few springs will stand such an extension without becoming permanently set, to a certain extent, and especially is this the case with the cheaper gauges. It is not a difficult matter to devise means for comparing with a test gauge, as any kind of force pump will serve the purpose, and in the abseoce of a special pump the boiler feed pump can be utilized. Gauges can be tested by fitting them to a piece of lead pipe, a gauge at either end, the pipe being bent to hring the gauges vertically. The pipe should be filled with water and then inserted between the jaws of a vise, when screwing up on the vise will bring pressure to bear on both gauges. This is, perhaps, as convenient a way as any, providing the lead plpe can be obtained, for in the absence of a vise a lever can be applied which will serve a similar purpose. An occasional test of a gauge should be made, says a writer in the Boston *Journal of Commerce*, if its indlcations are to be relied upon, and it is better to keep the pressure gauge in good order, and be certain that it records correctly, than to depend on the safety valve, whether of the lever or spring type, for these, too, are liable to improper working, if not given proper attention.

How Circular Saws are Made.

These saws are now made of cast steel specially manufactured for the purpose. An ingot heated to the requisite temperature is reduced to the proper thickness in powerful rolls. The plate is then centered and a clrcle scribed upon it, after which it is passed to the shearer, who reduces it to a circular form. The center hole, says *Work*, is then bored. It is then handed to the toother, who punches out the teeth around the edge, after which they are rough filed or ground on an emery wheel, to take off the burr left by punching.

The rough saw is now again heated in a large furnace until it is of a bright red color. It is then plunged into a bath of sperm oil, which makes it hard and brittle. The oil is then partly cleaned off, and the rest burnt off in a furnace to give the saw the required temper. When cold the saw is hammered on a steel-faced anvil until it is straight. It is next ground between vertical grindstones revolving in opposite directions, and then polished with emery on a large disk.

Once more the hammer men take it, and strike it with smooth-faced hammers on an anvil as before, until it is absolutely stralght and true, and has acquired the proper tension which allows for expansion while the saw is revolving at work. The teeth are now set, alteroately right and left, to allow for clearance when sawing timber. They are then sharpened by being filed on the front and tops of the teeth, which operation completes the manufacture.

What is a Corliss Engine?

One not versed in matters pertaining to the steam engioe, and ignorant of just what constitutes a Corliss engine, might have considerable difficulty in these days to determine what a Corliss engine is or was, says the *American Machinist*. The distinctive features of this engine, as huilt by its originator, were in the form of bed; ln having two steam valves at either end of the cylinder on top, and two exhaust valves at either end below; in its round or cylindrical valves, with their oscillating motinn; in its wrist-plate motioo for actuating these valves; and finally in the detaching device for enabling the governor to control the point of cut-off. Our ignorant visitors to the expositioo at Chicago who should go about the power plant there might conclude not only that any one of these features might be dispensed with, and the engine still be a Corliss; but that nearly all of them could he discarded, and still the name would apply. There are Corliss engines there that have not the Corliss form of bed-plate; others that have no oscillating valves; others that have no detaching devices; and stlll others that have no wrist-plate motion. Usage seems almost to have justified the application of the name Corliss to any engine which has four valves and an automatic variable cut-off.

Type-Setting Machines.

In type-setting machinery the application of mechanics to the art of printing is reaching a culmination. It ls stated that during the last 20 years upward of $9,000,000 have been expended in bringing the art of setting type by machinery up to its present state. Now, for all plain work, type-setting machines are available, says the *Engineering Magazine*. In the London *Times* office a curious arrangement has been adopted for the composition of the stenographic notes of the Parliamentary reporters in the House of Commons, in which type-setting machines play an important part. The stenographic notes are read directly to the operators of the machines, instead of being transcribed, as was formerly the case. Men at telephones in the House of Commons read these notes to men stationed at receivers in the *Times* composing rooms, who in turn read them to the type-setters. In this way these notes can be set up in type almost as rapidly as they could be transcribed by an expert typewriter; and it is said that the number of errors that creep in are not so numerous as to make the work of correcting proof much greater than by the old system, while a considerable saving in time and expense is effected.

An Improved Wire-Nail Maohine.

Among the many machine novelties now on exhibition at Chicago is an improved wire-nail machine, which, instead of taking in one wire, as those now in use do, runs five wires at once and turns out five nails at each stroke of the machine. There are two of these machines at work—one weighing only 1500 pounds, which will turn out 900 four-penny nails per minute; another larger one, weighing 3600 pounds, will make 750 eight-penny nails per minute. The decrease of weight of machinery, in proportion to the amouot of work done, is about four to one of the single-wire machines. This implies also a great decrease in the power required —about one-half. Twenty-one of these machines, it is claimed, wlll do the work of 100 single-wire machlnes, and at one-third less cost for labor. The cost of one five-wire machine is only about one-half that of five single-wire machines. There is also large economy in floor space.

One of the specifications in the patent as allowed is "the feeding of several lines of wire in a machine for making headed articles from wire." This is a sweeping claim, which makes all improvements tributary to the original invention—as did the eye in the point of the sewiog-machine needle.

If the claims of this machine are not overstated it will greatly reduce the cost of wire nails, and should also, to a certain extent, reduce their price.

Scientific Progress.

Length of Geologic Time.

In a paper before the American Association for the Advancement of Science, at Mllwaukee, Wis., Prof. C. D. Walcott, of Washington, D. C., attempted to define the limlts of geologic time. Sir Charles Lyell, basing hls estimate on modifications of certaln specimens of marine life, assigned 240,000,000 years as the required length of geologic time. Darwin claimed 200,000,000 years; Crowell, about 72,000,000; Geikie, from 73,000,000 upward; Alexander Winchell, but 3,000,000; McGee, Upham and other recent authorities claim from 100,000,000 up to 680,000,000 years. Notwithstanding this wide divergence, all agree in thinkiog the duration of the globe so great as to make man's occupancy of it seem but a span. The conclusion reached by Professor Walcott distributed geologic time as follows:

Cenozoic (including Pleistocene), about	2,900,000
Mesozoic	7,240,000
Palezoic	17,500,000
Algonkian	17,500,000
Total time of sedimentary rocks	45,500,000

The conditions on which denudation and deposition went on were given with minuteness and a formidable array of figures. As a specimen of Prof. Walcott's reasoning, it may be said that the rocks in the great interior basin of Nevada, Utah, etc., are 21,000 feet thlck, and cover an area of 400,000 square miles. The limestones are 6000 feet and the sandstones and shales 15,000 feet. At the estimated rate of deposit in the ocean of the present day lt requlred 1,200,000 years for the limestones of that area and 16,000,000 for the sandstones and shales, or 17,500,000 in all. With this as a unit, the tabular results were reached as already given. In other words, as compared with the conclusions of other geologists, Walcott would measure geologic time, not by hundreds of millions of years, but simply by teos of millions.

Greatest Depth of the Paoific.

TO THE EDITOR:—A recent article in your valuable journal, treating of ocean depths, gives the maximum so far known in the Atlantic, viz., 3875 fathoms. This is not the deepest water in the world, however. As the subject, in these days of telegraph cables, may interest many of your readers, allow me to state what has been found in the Pacific. In 1874 the U. S. S. Tuscarora, Capt. Belknap, while surveying for a cable hed, only about 100 miles off the coast of Japan, played out 4643 fathoms of wire (27,858 feet) without finding bottom. The wire then broke. This was too deep for cable laying, and the ship, running inshore, went considerably to the north and started on a new line. But again the water deepened rapidly, until the lead touched bottom in 4340 fathoms. The thermometer came up completely wrecked by the heavy pressure.

The next six soundings, at 40 miles apart, gave depths of 4356, 4041, 4234, 4120, 4411 and 4655 fathoms, about 5¼ miles. This line was not explored farther.

The figures are from the interesting paper of Commander Z. L. Tanner, U. S. N., read before the Geographical Soclety of the Pacific last winter. JOHN PARTRIDGE,

Secretary Geographical Society of the Pacific.

San Francisco, Sept. 7, 1893.

Diamonds in the Laboratory.

Henri Moissan, a Frenchman whose name has lately been promlnent in chemistry in connection with several important discoveries, declares he has finally succeeded in obtaining in his laboratory minute crystals of diamonds. The discovery is not absolutely new, and the French chemist himself mentions two of his English predecessors, says Prince Kropotkin in the *Popular Science Monthly*. Mr. Hannay obtalned in 1880 some diamond-like crystals by heating in an iron tube, under high pressure, a mixture of paraffine oil with lamp-black, bone oil and some lithium; and in the same year Sidney Marsden, by heating some silver with sugar charcoal, obtained black carbon crystals with curved edges. Besides, it was generally known that a black composed of transparent microscopical crystals, having the hardness of diamond, is deposited on the negative electrode when a weak galvanic current ls passed through liquid chloride of carbon. But these crystals, like those of Mr. Marsden, belong to the easily-obtained variety of black diamonds known as carbonados, while some of the crystals obtained by Moissan are real colorless and crystallized diamonds—the gem we all know and admire.

For industry and every-day life the infioitesimal quaotities of dlamond dust obtained by the French chemist may have no immediate value, and some time will probably be required before a modest-sized jewel is made in a laboratory.

Determining Straightness by Sight.

The straightest thing in nature or art is a ray of light when passing through a medium of uniform density; hence the eye is enabled to test the straightness of an edge or tube by holding it as nearly as possible coincident with a ray of light, such parts as depart from straightness then intercepting the ray and causlng a shade to be cast upon other parts, says the *Engineering Magazine*. It is not known at what early period in the history of mankind the discovery was made that

straightness could be thus determined. It is certain that thousands of mechanics use the methods daily without being able to give a rational explanation of it. This primitive mode of testing straightness, on accouot of its great convenience and accuracy, is likely to continue in nse to the end of the world.

How the Earth Will Die.

M. Camille Flammarion says that, in all probability, notwithstanding all circumstances which threaten it, our planet will die, not of any accideot, but a natural death. That death will be the consequence of the extinction of the sun, in twenty million years or more—perhaps thirty—since condensation in a relatively moderate rate will give it on one hand seventeen million years of existence, while, on the other hand, the inevitable fall of meteors into the sun may double this number. Even If you suppose the duration of the sun to be prolonged to forty million years, it is still incontestable that the radiation from the sun cools it, and that the temperature of all bodies tends to an equilibrium. Then the earth and all the other planets of our system will cease to be the abode of life. They will be erased from the great book, and will revolve black cemeteries around an extinguished sun.

Will these planets continue to exist even then? Yes, probably, in the case of Jupiter and perhaps Saturn. No, beyond a doubt, for the small bodies, such as the Earth, Venns, Mars, Mercury and the moon. Already the moon appears to have preceded us toward the final desert. Mars is much further advanced than the earth toward the same destiny. Venus, younger than us, will doubtless survive us. These little worlds lose their elements of vitality much faster than the sun loses its heat. From century to century, from year to year, from day to day, from hour to bour, the surface of the earth is transformed. On the one hand, the continents are crumbling away and becoming covered by the sea, whicb insensibly and by slow degrees tends to invade and submerge the entire globe; on the other hand, the amount of water on the surface of the globe is diminishing. A careful and reasonable calculation shows tbat by the action of erasure alone all the land on our planet will be covered by water In 10,000,000 years.

Scientific Notes.

—Prof. Lippman has succeeded In photographing simultaneously all the colors of tbe rainbow on a layer of albumen.

—Dr. Gallipe reports to the French Academy of Sciences, after eight years investigation, that all stones, such as gravel, found in the human body, are produced by microbes. Microbes are the authors of that chemical decomposition which results in calcareous deposits.

—It is said tbat a new industry has sprung up in France, the selling of milk frozen solid in cans. It has been discovered that milk can be kept perfectly fresh in a frozen conditlon for more than a month. It is frozen by means of an ordinary ice-making macbine, and dispatcbed by road, rail or steamer to its destination. The customer wbo purchases tbe frozen milk has simply to thaw it when it is required for use.

—Dr. Bowdler Sharpe suggested in a recent lecture on the geographical distribution of birds, before the Royal Institution of London, that there was once a great continent, with its center at tbe South Pole, now submerged under 2000 fathoms of ocean. It embraced, he said, South America, Madagascar, Mauritius, New Zealand and Australia; and thus he explained the existence of the cognate struthious birds that now exist, or once existed, in those countries.

—Prof. E. S. Holden says that if the brightness of a star seen with tbe eye alone is designated hy one, with a two-inch telescope it is 100 times as bright, with a four-inch telescope it is 400 times as bright, eigbt-inch telescope it is 1600 tlmes as bright, 16-inch telescope it is 6400 times as bright, 32-inch telescope it is 25,600 times as bright, 36-inch telescope it is 32,400 times as bright. That is, stars can be seen with the 36-incb telescope tbat are 30,000 times fainter tban tbe faintest stars visible to the naked eye.

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Electricity.

The Niagara Falls Electric Plant.

At the recent Electrical Congress in Chicago, Professor George Forbes, electrician of the Cataract Construction Company, told of the purposes of the company in utilizing the power of Niagara Falls. The aim is ultimately to supply power not only to factories in the vicinity of the falls, but to Buffalo, Rochester, Utica, Syracuse and Albany, and perhaps also to supply power to propel the boats on the Erie and other canals in New York State. The plant at the falls is thus described briefly: The water falls through penstocks 140 feet deep, at the bottom of which are turbines (Leffel's wheel) with vertical shafts. All discharge water goes into a large tunnel opening below the falls. The revolving field magnets of the dynamo are directly on the same vertical shafts. The armatures of the dynamos are stationary and are wound so as to give directly a pressure of 20,000 volts, thus dispensing with transformers at the generating station. At the receiving stations the pressure will be lowered by transformers to a safe pressure to handle. The same pressure on the mains will be used for distribution to points near and at a distance in order to avoid complexity of wiring and to save copper. The wires will be caried partly on poles and partly in subways.

In the discussion following, Dr. Bell thought the utilization of electricity for towing on the Erie canal was not so near as might he. The overhead line would be difficult to keep up, and the conduit was commercially impossible. We must employ overhead bare wires. No insulation that could be put on would stand high voltage. In theory the conduit was all right, but commercially its cost prohibited it. As regards the distance over which power could be transmitted, he did not think any one would care to set the limit. A distance of 50 miles and under was enough to keep all busy for the next decade. If only coal was cheap enough, power could be transmitted any distance. It was thus more of a commercial than an electrical problem.

Electricity at the World's Fair.

The current number of the *Cosmopolitan Magazine* contains, among many other interesting articles on the World's Fair, one by Murat Halstead on the electrical service. Mr. Halstead says in part: "The whole electrical service at the exposition comprises these systems: Arc lighting, incandescent lighting, electric power, telephone service, police signal service, fire alarm service, telegraph service, electric transportation. There are many minor matters with new applications of electricity. In 1889, in Paris, far the greatest of preceding expositions and the only one with which it is worth while to compare the Columbian Fair, there was used for electric lighting 3000-horse power. There is devoted in Chicago to electric light and power in the main plant alone 17,000-horse power—14,000 for light and 3000 for the transmission of power. There is 1000-horse power in addition in isolated plants and 5000-horse power for the plant of the intramural railway company. The aggregate is 23,000-horse power. The Paris exposition electric lighting was furnished by 1150 arc and 10,000 incandescent lamps—about 1,000,000-candle power. The Chicago electrical illumination at the fair is provided by 90,000 incandescent lights of 16-candle power, and over 5000 arc lamps—a total of 11,400,000-candle power. These figures are from original estimates that have been largely exceeded. The reserved forces brought up the grand total capacity of the electric plant to 5000 arcs of 2000-candle power each, and 120,000 incandescent lights of 16-candle power, the total amounting to about eight times all the plants at Paris. The greatest electrical feature we cannot, however, compare with anything in Paris, because it is new; this is the almost exclusive use of electricity for the transmission of power.

New Electric Arc Lamp.

In a paper before the recent Electrical Congress at Chicago, Prof. W. D. Marks described a new form of electric arc lamp, invented by Louis E. Howard of New York City. The carbons are inclosed in a tight glass globe of small size, closely fitted to the lower carbon, and fitted to the upper carbon as tightly as is possible without interfering with its motion. When current is first turned on the oxygen contained in the air in the interior of the globe at once combines with the carbon to form carbonic dioxide, so that the globe is soon filled with a mixture of inert gases which cannot support combustion. The carbon vapor from the glowing arc is deposited on the interior of the glass and so confines the radiant energy from the arc that the whole globe and the gases within it become heated to a high temperature and glow like the carbon in an incandescent lamp. The arc itself can hardly be distinguished, the light appearing to proceed from the whole mass of the globe. Of course the glass globe must be of highly refractory material, and the smaller its size the higher the efficiency. By way of comparison it may be said that ordinary incandescent lamps give from 150 to 200 c. p. per electrical H. P. of energy consumed; the arc lamp, from 500 to 100 c. p. The new lamp above described is said to have showed an efficiency of 888 c. p. per E. H. P. in tests recently made at Cornell. The advantages of the new lamp are its greater steadiness, pleasanter light (the intense glare of the ordinary arc lamp being done away with), and saving of carbons, the consumption of the positive carbon being only one to five per cent of the consumption in an ordinary arc lamp.

Cable Perforated by Grass.

The dangers to which underground wires in tropical countries are liable are illustrated by a picture which has been sent from India, says *Invention*. This picture shows a piece of rubber cable (Hooper's core) perforated by a root of grass, which still retains its vitality and thrives vigorously. It appears that the piece of core in question, after being treated with a composition which was supposed to make it proof against white ants, was buried, for a six-months test, unprotected by any armor, in soft, damp soil at Calcutta. On the piece of core being dug up the grass was found to have grown through it. What might appear an impossibility is explained by the statement that roots of the particular grass have very hard, sharp points, not unlike needles.

Small Telegraph Facilities.

In the whole of Peru there are, according to accounts, only 36 telegraph offices. In the territory of Paraguay there are only 510 miles of wire in operation, and the entire telegraphic service of that country gives employment to about 28 persons. One line of 360 miles, owned and operated by the Government, runs from Asuncion to Paso de Patria, the limit of Paraguayan territory, and the other 150 miles by the railroad from Asuncion to Pirape. Owing to high water and camp fires in that country the line is often interrupted for days at a time. In fact, Peru, Paraguay, Uruguay and Persia are said to be the four countries possessing the smallest facilities in the world.

Electric Boring Machine.

Another new application of electricity is that of boring or drilling into the earth. A new boring machine of this nature is now being tested in the new power house of the Broadway surface road at Fifteenth street and Sixth avenue, New York. In this house, according to the New York *World*, there is a brass cylinder, 22 feet long and about 5 inches in diameter, suspended vertically from the ceiling. At each end of the cylinder is a peculiar piece of mechanism. The whole is a new electric drill, which it is proposed to test by boring an artesian well 1500 feet deep in the boiler room of the power house. The mechanism at the lower end of the cylinder is the drill head, which is made to revolve by electricity. There are five powerful little motors in the cylinder above the drill head, which is armed with 22 black diamonds cast in solid steel plates. The motors can develop a force of 50-horse power, and cause the drills to revolve 2500 times a minute. There is a mechanism at the upper end of the drill by which it can be steered in any direction. The inventor says that by a cable attachment he can bore into the earth to any distance.

Useful Information.

Available Timber Supply.

The Division of Forestry of the Government Department of Agriculture, through its Chief, B. E. Fernow, is now disseminating valuable information relative to the timber supply of the United States. The value of the products derived from our forest resources, says the last report of Mr. Fernow, amounts to more than $1,000,000,000 annually, and as a single industry is only surpassed by agriculture itself. But that this vast industry sadly needs fostering care, intelligent attention and a close study of present demands and future needs and resources is proved by the vast consumption of timber in this country as compared with that of other countries where necessity has formulated and enforced protective laws. According to the census reports of 1890, the annual consumption of wood for all purposes has reached the enormous total of 22,000,000,000 cubic feet annually, or about 350 cubic feet per capita, as compared with 12 to 14 cubic feet per head in Great Britain and 40 cubic feet in Germany.

The largest amount of this consumption is for firewood, or about 280 cubic feet per capita; but this wood in the United States comes to a large extent from split body wood of the best class of trees, and not from the inferior material used for this purpose in older countries. The consumption of sawed wood products is over 40 cubic feet per head; and if to this is added hewn timber and wood used in railway construction, the total annual requirements for sizable timber will easily reach 50 cubic feet per head. To produce such amounts the annual growth of not less than 500,000,000 acres of well-managed forest in good condition would be necessary, and it would more than double this acreage to add the consumption in firewood, mining and fencing, for which we use body wood, hardly inferior to sawed timber. According to the most carefully compiled statistics, we now have only about 480,000,000 acres of forest area, and a large part of this is believed to be in a more or less devastated condition, owing to forest fires and general lack of care. We have, therefore, been using for some time more than our annual growth and are rapidly cutting into our inherited capital account. Even assuming the figure of a present annual consumption of 10,000,000,000 cubic feet, as claimed by some authorities, the supply would be exhausted in less than 100 years, for our consumption has increased at the rate of about 30 per cent in the last three decades.

A Mammoth Kite.

The largest kite ever made in the United States is that produced in Durham, Greene county, N. C. The frame consists of two main sticks 28 feet long, weighing 75 pounds each. All the sticks were 2x6 inches in dimensions. Over the framework was stretched a great sheet of white duck 25x18 feet, which weighed 55 pounds. The tail of the kite alone weighed 50 pounds and contained 155 yards of muslin. Twenty-five hundred feet of ½-inch rope served as kite strings. The plaything cost $100, and when it is mounted into the air it exerts a lifting power of 500 pounds. Six men once permitted it to ascend 1000 feet.

Pump With One Moving Part.

A new and simple pump with only one moving part, suitable for raising large bodies of water, as in the case of mines, has been invented by M. Dejean de Touroque, former pupil of the Paris School of Mines. A close chamber is formed below the level of water to be lifted, communicating with the surface by a pipe of about 5-inch diameter, which forms the raising main, and by another pipe for the introduction of air to supply the place of the water to be raised. The top of the chamber is also provided with a sliding valve which may be opened or closed from the surface. At the top of the raising main revolves a sleeve, with three curved and hollow arms like those of the Barker's mill, of which this invention is the converse. To start the pump the sliding valve of the chamber is closed, and the air pipe filled with water until it flows out at the arms. A rotary motion is then given to the latter, the sliding valve being opened, when the water flows from the arms in volume proportioned to the speed of their rotation. The weight of the revolving portion is taken by a footstep through the revolving spindle, where alone there is any friction, the joint at the sleeve being only tight enough to prevent escape of the water. Trials with this pump at Belves, in Dordogne, have shown that it is capable of raising a large volume of water with the expenditure of very small power, while there are no working valves to become clogged by obstructions.

The Guano of the Nile.

For quite two years at least a group of English financiers, in which there is a sprinkling of French blood, has been endeavoring to obtain, and has at last obtained, a perpetual concession for the collection and utilization of all that magnificent mass of what, for want of a better term, we will call guano, which is floated down the Nile, and has, during a long succession of centuries, assisted to build up and fertilize the Nile's verdant delta, says London *Money and Trade*. The putrid carcasses and waste of ten thousand habitations and all other things that the great river can gather up in its course, have been found, together with its sand, to make the most perfect manure—a manure, indeed, which surpasses even nitrate, for while this latter exhausts the ground after a few years, the "Nile guano" continues to enrich the soil year after year, the only possible disadvantage being that the soil might become too rich. This, however, can be easily avoided by the application of a little congenial saod. The excellence of the guano and the terms of the concession which has just be obtained, are such as suggest profit-making in the future.

How Scissors Are Made.

Though no complexities are involved in the making of scissors, yet the process is very interesting. They are forged, says an exchange, from good bar steel heated to redness, each blade being cut off with sufficient metal to form the shank, or that destined to become the cutting part of the bow, or that which later on is fashioned into the holding portion. For the bow a small hole is punched, and this is afterward expanded to the proper size by hammering it on a conical anvil, after which both shank and bow are filed into a more perfect shape, and the hole bored in the middle for the rivet.

The blades are next ground and the handles filed smooth and burnished with oil and

emery, after which the pairs are fitted together and tested as to their easy working. They are not finished, however. They have to undergo hardening and tempering and be again adjusted, after which they are finally put together again and polished for the third time. In comparing the edges of knives or scissors it will be noticed, of course, that the latter are not in any way so sharply ground as the former, and that in cutting, scissors crush and bruise more than knives.

A Simple Barometer.

A simple but effective barometer can be made, says a contemporary, by filling a common, wide-mouthed pickle bottle within three inches of the top with water; then taking an ordinary Floreoce oil flask, and, having removed the straw covering and washed it thoroughly, plungiog the neck of the flask as far as it will go into the pickle bottle, you have thus a complete barometer. In fioe weather the water will rise into the neck of the flask higher than the mouth of the pickle bottle; in wet and windy weather it will fall to within an inch of the mouth of the flask. Before a heavy gale of wind, at least eight hours before the gale reached its height, the water, has, it is said, been seen to leave the flask altogether.

New Kind of Motor.

Herr Diesel, engineer, Berlin, has according to the *Schlesisches Gewerbeblatt*, devised a new kind of motor. Atmospherlc air is suddenly compressed in a cylinder up to 90 atmospheres pressure. It is thereby greatly heated. At the moment the piston begins to returo, either coal dust or a combustible gas is let lnto the cylinder. It there takes fire, because the temperature is up to the kindling point. The force of the explosion due to this drives the machine. The motor would correspond, theoretically, to a very great advance, since the coal consumption per indicated horse power would be only 0.22 lb., and the dlmensions of the machine are considerably smaller than those of a steam engine of equal power.

The Largest Artesian Well.

Chamberlain, South Dakota, now enjoys the distinction of having within its limits the largest artesian well in the United States. Early dispatches placed the flow at 3000 gallons per minute, but since then the flow has increased, nntil on the evening of the 5th inst. it reached the enormous quantity of 8000 gallons per minute. The well is eight inches in diameter and the water is thrown to the height of over 14 feet above the top of the pipe. The only other well in the Uoited States which compares with the one at Chamberlain is at St. Augustine, Fla., which is 12 ioches in diameter, and flows at the rate of 7000 gallons per minute.

Gypsies and Religion.

Gypsies have no religion and some of them have so strong an aversion to churches that they never pass by one without a muttered curse. In European countries they never suffer themselves to be buried in a churchyard, but, whenever allowed, they bury their dead in out-of-the-way places. Their antipathy to churches and religious forms is supposed by some persons to have originated from their persecution by the priesthood in the middle ages, but, whatever its origin, it is a fixed fact.

Wild Hair.

A "wild hair" is the most annoying freak of nature a man can be afflicted with. It grows in from the eyelid instead of out, and constantly brushing against the eyeball, sometimes causes an irritation that results in loss of sight. To pull it out gives only temporary relief, since in a few weeks it comes back, as well grown and strong as ever. The only way to kill it is to destroy the sac from which it springs.

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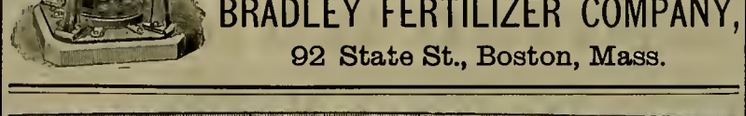

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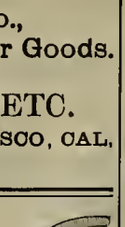

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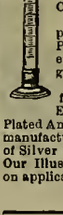

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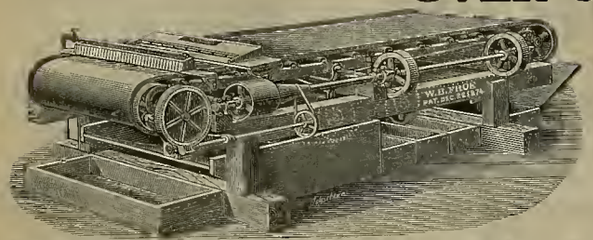

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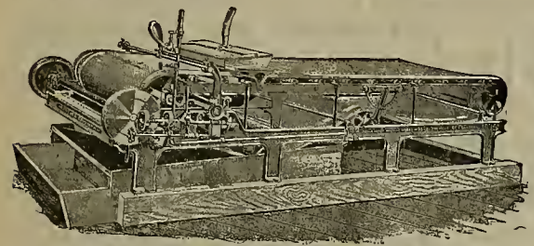

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FOR THE CONVENIENCE OF OUR READERS IN THE MINING COUNTIES WE PRINT IN LEGAL SIZE, 12x36 INCHES, THE MINE BELL SIGNALS AND RULES provided for in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Mine Bell Signals to Be Used in All Mines Operated in the State of California, for the Protection of Miners." We can furnish these Signals and Rules, printed on cloth, so as to withstand dampness, for 50 cents a copy. MINING AND SCIENTIFIC PRESS, 220 Market St., San Francisco.

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BUCYRUS STEAM SHOVEL AND DREDGE COMPANY,
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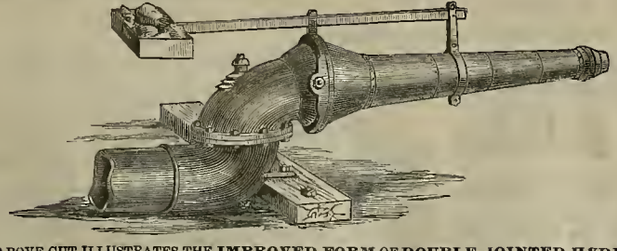
IMPROVED FORM OF HYDRAULIC GIANTS.



THE ABOVE CUT ILLUSTRATES THE **IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS** which we manufacture, and which are pronounced far superior to the SINGLE-JOINTED style. The latter, however, we furnish when requested. Prices, discounts and Catalogues of our specialties of Hydraulic Mining Machinery sent upon application.

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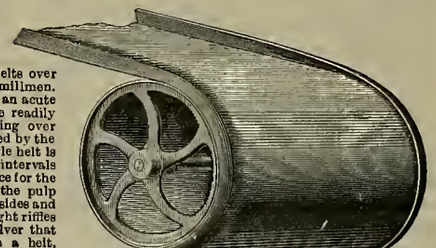
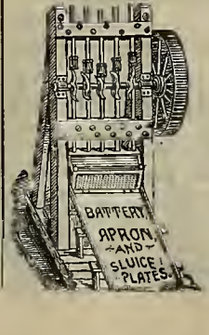
THE BLASDEL CONCENTRATING BELT COMPANY.



We are now having our new Improved Concentrating Belt manufactured in San Francisco. We keep always on hand Belts suitable for the Triumph and Frue machines, but can make any length or width desired. The advantages of these belts over *any others* will be readily seen by practical millmen.

First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers; thus the vexation and loss caused by the frequent breaking of the flanges of the old style belt is practically done away with. Again, our belts, at intervals of two to four feet, have a very slight riffled surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it from banking on the sides and forming channels through the center. These slight riffles also save very fine sulphurets and the quicksilver that would otherwise escape with the tailings from a belt, the surface of which is entirely smooth. We can safely say that it is a better concentrator belt than has ever been manufactured. It will last much longer and will handle more pulp. We also manufacture smooth belts with same flanges when desired.

H. G. BLASDEL, Jr., Manager, 419 California St., San Francisco.



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Coast Industrial Notes.

—A big hotel nn the ocean beacb near San Francisco is projected.

—A new steel plant, utilizing a new process, is projected at Oakland.

—The San Francisco Sewer Commission has been abolished by the Board of Supervisors.

—The Coast Sailors' Union has volnntarily reduced the scale of wages from $40 to $35 per month.

—General Superintendent Gabel, of the Atlantic & Pacific, says the prospects of extension of the road to San Francisco are "very good."

—After the 15th inst. coal goes up at Victoria, according to published announcement, to $7 cash per ton.

—The Pacific Iron and Nail Works of Oakland which were destroyed about five weeks ago, are to be rebuilt immediately.

—It is said that the Southern Pacific has decided on a new bond issue of $89,000,000, part of which is to be expended on new lines.

—A survey corps is locating the the line nf the Monterey-Fresno railway between Hollister and Salinas. It is said construction will commence next month.

—The trustees of the Southern California Inebriate Asylum have rejected all bids for the construction of a new wing, owing to a change in plans, and will advertise for new.

—Designs have been accepted for the construction of a $1,000,000 building on the lot of the Parrot Estate, San Francisco, opposite the Baldwin Hotel, on Market street.

—The next earniugs of the Southern Pacific Railroad Company, Atlantic and Pacific systems, for the first six months of 1893 show an increase of $313,902 over the same period of 1892.

—The Pacific Insurance Union has appointed a committee to revise rates in Tulare, King, Fresno and Madera counties, and to add the three-fourths clause to all policies in those counties.

—The Oceanside bank, organized under the California State law, has been closed by order of the Bank Commissiouers. By good management the depositors, to whom was owed $28,000, will be paid in full.

—The report of the sale of the controlling interest in the San Diego cable railway to the Electric Storage Railway Company of San Francisco is confirmed by news that electric storage cars bave been shipped to San Diego.

—Judge John L. Campbell has sold his interest in the Lytle Creek water course to A. G. Hubbard, the Harqua Hala millionaire, for $45,000. The water is leased to the city of San Bernardino for a term of 20 years for an annual rental of about $4500.

—Sandford Fleming, a noted Canadian engineer, who laid an Atlantic cable, leaves by the Warrimoo Saturday for Australia, to lnquire into the feasibility and tbe probable cost of the construction of a cable from Australia to Vanconver, touching at Honolulu and other islands of the Pacific.

—Congressman Hilborn has lntroduced these blls: To provide an appropriation of $500.000 for a public building in Oakland and $100,000 for Alameda; also a bill providing for the construction of a revenue cutter to be used as a boardlng-vessel in San Francisco harbor, to cost $50,000.

—The Spokane Exposltion Building, an immense structure erected in 1890 at a cost of $100,000, was destroyed by fire Sunday. The building was owned by several business firms who held judgments against it. There was no insurance. It was an unprofitable investment, and will probably not be rebuilt.

—Major Heuer and bis corps of engineers have just completed a double cut-off in the San Joaquin river, near Stockton. This was done by cutting off two sharp bends in tbe river, and thereby straigbtening it at that point. Tbis will not only aid navlgation, but tend to protect the city of Stockton in the event of freshets.

—The newly-completed Spokane city hall was nearly destroyed by fire Wednesday, the foundation and first-story walls alone being saved. The jail and fire-station annex escaped with sllght damage. The building would have cost, complete, $100,000. The loss ls estimated at $40,000; insurance, $65,000. The origin of the fire is unknown.

—About two weeks ago the Union Transportation Co., wbich operates tbe opposition steamers between Stockton and San Francisco, asked all the crews of tbe Captain Weber and the Dauntless to accept a reduction of 10 per cent in wages. This reduction was to apply to all hands from the captain down to tbe waiters. The engineers and firemen have decided to decline the request.

—Fall fishing on the Columbia river began September 12th, when abont 200 boats went out to the fishing grounds to cast their nets. From all reports fish are running slack, and a poor season is looked for. Two canneries only, Kinney's and Hawtbnrn's, have opened up at Astoria, and tbe ruling price to fishermen has been fixed at 1¼ cents per pound, though it will probably rise to 3 cents before the season's close.

—The Southern Pacific Company proposes to compel payment of fares in Oakland. On each side of the cars a gate will be attached for the purpose of shutting out the non-paying citizens, and nobody will be permitted tn get on the cars unless he or she has a nickel. For this purpose ticket offices will be establlshed at each of the stopping-places, where passengers may secure the necessary pieces of pasteboard admitting them to the cars of the company.

—School Director Girard of Oakland has entered a vigorous protest because the work on the new school buildings in the city has not been commenced. No work has been done on the new schools in tbe Third and Seventh wards, which have been contracted for. Girard says that the money for these schools has been in the treasury 18 months, and the city has to pay interest on the bonds issued. He thinks it is high time to take action, so that the idle workingmen may have something to do.

—What may turn out to be a big war in rates between the Southern Pacific and the Santa Fe railway lines has been commenced. The Southern Pacific Company has notified its connections east and north that the southern California end of the Santa Fe system has made a cut of $4 on through tickets to the East and threatens still deeper cuts, and in view of this the Southern Pacific asks the lines with which it connects to share pro rata with lt in meeting the $4 cut, and others if they be made.

—A contract has been let by the Government to the San Francisco Bridge Company to cut off the more troublesome bends in the San Joaquin at Twenty-one-mile Slough, which will make the river straighter and greatly improve navigation. These cuts and others recently made near Stockton will shorten the distance to San Francisco two miles and make tidal action greater. The contract price for removing 200,000 yards and making tbe cut 24 feet wlde is at the rate of 9 cents a yard.

—Contracts bave been let at San Diego for the brickwork, plastering and decorating necessary in the restoratlon of the old Mission of San Luis Rey. The work involves an expenditure of $150,000. The contract fnr brickwork was awarded to Cornelius Kavanaugb of San Diego for $35,000. The work will commence Monday. The plastering contract was given to James McNear, also of San Diego, for $13,000. Most of the carpentering work is to be done by tbe Franciscan Fathers themselves, who are in charge of the mission.

—Active operations on the construction of the harbor jetty at San Diego will be commenced in about ten days. Workmen are now making lighters and stone boats at Russ wbarf, which will soon be ready. Lumber for the office has been forwarded to Nortb Island. The engineers, firemen and foremen of the various branches of work bave been already engaged. The track of the National City & Otay R. R. to Rock quarry in Sweetwater valley is being pushed and rock will be forwarded to the site of the jetty in a week more. The first 500 tons will go over the Coronado track.

—The directors of the Davie Ferry Company of Oakland have decided on tbe character of the two boats they intend to build for the Oakland creek route, and a handsome model in accordance with the plans bas been completed. It calls for a double-ended propeller 184 feet long by 31 beam, 12 depth and 10 draught, with a speed of 17 knots. Mr. Davie states tbat the vessels will be built under the supervision of J. J. Ebert, who is a part owner in the Rosalie. If the steamers realize the speed projected for them they will make the run to the foot of Broadway, Oakland, in 21 minutes.

—A settlement has at last been reached between Oakland and the Pacific Dredging Co. witb respect to the cost of dredging Lake Merritt for tbe boulevard. The City Engineer reported that the company bad dredged 57,966 cubic yards which bad been placed behind tbe boulevard retalnlng wall. He also reported that 20,600 cubic yards had been placed outside tbe wall. The question arose as to whether the company should be paid for the latter number of yards, wbich at 30 cents a yard would amount to $6180. The company abandoned its claim to the latter dredging, with tbe exception of about 7000 yards. A compromise was affected by which the company was given credit for 4000 of the 7000 yards. This amount added to 57,966 yards made a total of 61,966 yards, for which the bill, amounting to $8155.92, was rendered and allowed. The contract was then annulled and the bondsmen discharged.

—The statement of the Southern Pacific Company nf shipments fnr the week ending September 9, shows a heavy movement of Santa Clara county products to the eastern markets. The total sbipment aggregates 2,839 000 pounds, an increase of 1,000,000 pounds nver the corresponding week last year. This total is made up of the following items: Canned goods, 243,430 pounds: dried fruits, 1,232,875; green fruit, 1,749,555; wine and brandy, 54,999; leatber, 1,870. Shipments to San Francisco and California points amounted to 1,562,110 pounds, making the total sbipments, 4,401,110 pounds.

—The work of dredging the harbor in front of Oakland will be commenced in a few days by Captain Hackett. The work which is yet to be finished is the completion of the tidal canal, the buildlng of a bridge at High street, the extension of a south jetty, the dredging of the interior cbannels and the buildlng of a dam at San Leandro. To finisb the work it is estlmated that $841,000 will be required. Colonel Mendell, who is in charge of the work, says that it is impossible for him to determine when the people of Alameda may be gratified by the finishing of the tidal canal, as tbe matter depends upon the appropriation.

—A big contract for improving Seventeentb street, Sacramento, has been let to B. Labs at tbe following figures: Per cubic yard of earth, excavating, 5 cents; price per cubic yard of earth, scraper worker, 15 cents; price per cubic yard of earth, hauling from block to block, 30 cents; price per cubic yard of macadam, $3.50; price per square foot of rock gutter, 12 cents; price per lineal foot of new curbing, 12½ cents; price per round corner, $3; price per lineal foot setting granite crosswalks, 25 cents; price per lineal foot of old wood curbing, to be reset, 8 cents; price per apron, $2; price per catch basin, complete, $35; price per lineal foot of ironstone pipe, 35 cents.

—William Sproule, Assistant General Freight Agent of the Southern Pacific, reports that the shipments of deciduous fruits show an increase over those of last year. The figures are as follows:

GREEN FRUIT.	Season 1893. Carloads.	Season 1892. Carloads.
September 1st to 11th, inclusive	510	335
August 1et to 31st. inclusive.....	1,644	1,416
Season to date.....	3,612	2,766

Each carload is estimated to contain 11½ tons, which will give a total of over 41,000 tons of deciduous fruit sent East tbis season. The demand for fruit cars ls still great, and the aggregate shipments this year will be much greater than tbose of last season.

Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

GENEEAL RESUME.—*Record*, Sept. 7: At the South Eureka mine a few men have been added to the working force during the past week. . . J. W. Traek has a gravel claim in Rancheria district that he tbinke deeerves some attention from mining men. He eaye the gold is coarse, that large amounts have been taken out in years past. It needs some capital to properly work it, hut not a great deal. . . J. H. Tibhite, enperintendent of the Alhany mine in Jackson, speaks very encouragingly of the future of that district. He eays that several new hoieting plants and deep shafte are now in view south of the famous Kennedy, and thinke several additional dividend payere will he added to the list in a ehort time. . . Preparations are being made and eupplies laid in preparatory to einking at the Pioneer mine. Thie property ie on the mother lode between the Kennedy and Alma minee. Another company ie being organized in San Francieco to operate an adjoining claim to the sonth of the Alma. On every hand the clang of preparatione for the opening of new mines is heing heard. . . Samuel Wearne, H. R. Camphell and H. Cook are the contractors at the Belmont mine. The Boss ehaft is drained to the 200 level and the north drift ie heing extended, in the face of which ehows good indications, and etringers of quartz are coming in whicb aesay fairly well. It is the intention of the company to put in a hoieting plant if the preeent drift opens np as well as expected. The shaft will also he sunk to a deeper level. . . Superintendent Kyle is doing all he can to hring the Quartz Mountain mine forward as a dividend payer. The mill and everything connected therewith is being put in first-class order eo as to work the ore ae cheaply as possible. The rock eo far has heen of a low grade, hut it is helieved that it can be made to pay. There is a 15-foot ledge at present in their tunnel, eix feet of wbich is fair milling ore. The balance of the vein is epotted, showing coneiderable enlphnrets. but little free gold. . . Soperintendent John Myers of the Bunker Hill mine reporte that they have 200 tons of fair grade milling ore on the dump, all of which was taken from the 350 level of the Mayflower ehaft. There are two ledges in sight, one ehowing a width of 14 feet and the other of ahont eix feet, the narrower ledge assaying the heet. The new tramway is completed and a general overhanling of the mill machiuery is taking place. It is expected that the stampe will he dropped by Thursday of next week. Superintendent Myers eays that when mattere are all in good working order be expecte to be able to mine and mill tbe ore at a cost of not over $2 a ton. Tbis ehonld leave a fair margin for profit even though tbe ore continues to he of low grade. They are now employing 15 men, hut thie force will he added to coneiderably in the near futnre.

Butte.

A GOOD CLEAN-UP.—Oroville *Mercury*, Sept. 11: Wm. Eogland, the owner of the rich qnartz ledge, was over from Bangor on Friday and brought with him over $3000 in gold which be ponnded ont in a hand mortar during the paet few weeks. It was sbipped tbrongh the Bank of Rideout, Smith & Co. to the mint at San Francieco. Mr. England will cease operatione for the winter, heing contented with the reenlt of hie last few weeks' work. The ledge ie two feet wide and of marveloue richuees.

Nevada.

THE GOON HOPE.—*Tidings*, Sept. 5: William Paecoe, president of the Good Hope Mining Company, and Wm. Eddy, one of tbe principal ownere, are up from their mine near Cahbage Patch. The gentlemen report that everything is looking fine in their vicinity. The company now have their four-etamp mill engaged in crushing ore, which ie yielding handsomely. The ebaft is now down ahont 100 feet and the ledge holds good. They are now engsged in eorting ont eome ore to eend to the Selby Smelting Works, all of which will pay $200 per ton aud over. Several San Francieco capitaliets have recently examined the mine and bave become etockboldere in the company, who intend eoon to begin the einking of a new three-department shaft on the ground. The four-stamp mill has been found inadeqnate and a new ten-stamp mill with all modern improvemente will eoon take ite place.

THE REWAEN.—*Herald*: Gen. S. W. Backus, Col. Wm. Macdonald, Col. R. D. Laidlaw, Sam K. Thornton and Edward C. Sntcliffe, San Francisco capitaliste, who are owners of the Reward mine, arrived in Nevada City on Satnrday morning to inepect the property. They were joined tbere hy Dan Cole, preeident of the company, and Meesrs. Thomae and Walrath took the party ont to the mine. The Reward, for a new enterpriee, is a "hoomer." It hae heen opened during the paet eix months, and is yet a proepect, hut such a proepect as will gladden the bearte of the friends of mining. The ledge now averagee from one to two feet in width, and the rock aseaye, by mill procese, over $100 a ton. It is the eonth extension of the Gold Tunnel and California ledges, which were once the richeet mines in thie district.

NEW MILL.—*Telegraph*, Sept. 2: W. C. D. Body will leave Monday for Iowa Hill, where he will build a mill for the Morning Star Gravel-Mining Company. The old mill will he torn down. He will have the mill completed in ahont eix weeks.

CHANNEL STRUCK.—*Tidings*: Jamee Pollard, at Yuha river, with James Vineyard, T. C. Bourne and D. E. Matteson, ie working gravel diggings. A rich channel hae heen etruck that yielde $10 to the pan. This channel was fonnd at a deptb of 15 feet. The company intends to work the river bed.

ANOTHEE MINE.—*Tidings*: Joeepb Powning of the Orleans Mining Company has organized a company of New York and San Francisco capitaliete to work the New Orleane claim on Madieon Hill, adjoining the Empire mine. Work will he commenced next week, and a new two-compartment incline ehaft will he sunk. Machinery eufficient to work the mine to a depth of 1000 feet will he erected nnder the enpervision of Joe. Bennallack. The location is a most favorahle one, and it is to he hoped that a paying mine will he developed. A ten-stamp mill will he erected on the ground in a ehort time, and it is expected to have everything in working order before winter sets in.

MINING GROUND BONDED.—*Tidings*: The Baltic Mining Company has bonded the Smith claim, adjoining the old Butler orchard, and lately eix men were put to work on the claim. There is a well-developed quartz ledge on the ground, and it is the intention of the company to extract eeveral tone of the ore, which will be crnehed in the Baltic mill ehould the enpply of quartz at the Baltic at any time run short. The Baltic Company has bonded the claim for a period of three yeare, and it is the intention of the company to eecure as much adjoining ground ae possihle. The mine ie looking firet-rate at present, and the work is heing rapidly pnshed forward.

THE DAM OVERFLOWED.—Grass Valley *Union*, Sept. 13: A numher of men employed hy tbe Yuha River Mining Company were in town yesterday. They will he idle for several days on acconnt of the dam which turne the water from the workinge overflowing and filling the hole with water. It will take eeveral days hefore the water can he pnmped ont and work reeumed on the river hed. Some very rich gravel hae heen taken out of theee workings recently, and the managere are confident that

if the rains hold off long enough they will make a handsome cleanup.

RUMORED MINING DEAL.—*Union*, Sept. 13: It was rumored on the streets last evening that James D. Hague, the well-known mining man of New York, now in this city, had purchased the bulk of the stock in the Stockbridge mine, and will proceed immediately to open and develop the same. The Stockbridge is situated near the Rocky Bar and is known to be located on good ground.

THE ST. JOHN.—*Union*, Sept. 13: A good-sized stream of water was struck in the lower level of the St. John mine early Tuesday morning. This is a good indication and denotes that the ledge is near at hand. The miners have been working in good-looking rock for some time, but are of the opinion that the real ledge has not yet been discovered. They expect to strike the main ledge in a few days, and then some very rich ore may be looked for.

THE GRANITE.—*Union*, Sept. 13: Supt. Fowler last evening informed a *Union* reporter that pumping at the Granite Hill had commenced, and that they expect to "see bottom" in 10 or 12 days more, when active work will be commenced. Joseph Everett will shortly erect a new water wheel on the mine for hoisting purposes, and the wheel now there will be used for pumping only.

Placer.

THE MOORE.—Placer *Herald*, Sept. 9: T. M. Tharp, one of the owners in the Moors quartz mine located a mile or two below Auburn, informs us that their ledge, which yielded about $40,000 from a shaft on it 300 feet deep, continues to show new merit with each additional development. At a depth of 100 feet, they run a level in 80 feet and found rich rock all the way. They are now running in on the 180-foot level, and the ore is even richer than it was nearer the surface. All the rock is of a high grade for milling, and in many places it is rich enough for specimens. On the forenoon of Saturday they uncovered a rich body of ore and took out before dinner that day at least $1000.

THROUGH HARD ROCK.—Towles Cor. *Argus*: Rodger & Co. have passed through the 60 feet of extremely hard rock in their bedrock tunnel near Shady Run. This hard stratum has required three months hard work. They expect to advance faster now and reach the channel within 200 feet from the present point.

Plumas.

NATIVE COPPER.—*National Bulletin*: We have received from A. M. Gee of Taylorville a very rich and handsome specimen of native copper from the latter's mine in Mountain Meadows. The ledge is about two feet wide, and the ore is literally tied together with native copper.

San Bernardino.

PLACER DEPOSITS.—John Metcalf brings the news from Bear valley that rich placer claims have been discovered near the Bear Valley dam on timber land owned by T. J. Wilson, deputy county assessor, going 20 cents to the pan. Many claims have been staked out and a number of miners are hard at work on the new discovery. The Valley Gold Company of Halcomb valley are putting in a steam shovel to handle the dirt, and are preparing to work their claims on an extensive scale.

Shasta.

ACTIVE WORK ON MINES.—*Courier*, Sept. 9: Ten of the 20 stamps at Bullychoop began pounding rock Monday. Mr. Hart is getting things in running shape and everything will hum soon. The cyanide process has proven a fizzle at Bullychoop, as it did at the Gladstone and it is the intention to erect an extensive chlorinating plant there soon. Marley and Jaegel are making a big success out of their new works at South Fork and expect to turn out bullion at a lively rate. The McMahan works are also making a success working the ores of that camp. The works are under the supervision of Frank Satterlee and Mr. Reed. E. Ballou has his South Fork milling works in operation and is working ores from his mines. Whit George struck a fine prospect in his new ledge at Muletown, and is driving away with good chances of uncovering a rich vein. The ledge runs parallel with the old Potosi owned by Senator Jones. H. J. Bunnell intends to run a 300-foot tunnel on his ledge on Muletown mountain near the Potosi, to drain the mine. The water and bad air have stopped work in the shaft and caused considerable expense. The tunnel will tap the vein 50 feet deeper. The New Year, owned by L. Garrecht and others of Shasta, is developing into a great mine and we should not be surprised to see a second Mammoth here on the West Side. Garrecht showed us samples of rock picked up at random on the dump, which were rich with gold. They also contained sulphurets of high grade. Garrecht also showed us a pill box full of fine gold panned from a shovel full of dirt and quartz from the shaft. The owners are prospecting and developing the mine and have a five-foot vein in the bottom of the shaft. Jim Hill showed the *Courier* some great specimens taken from the dump and shaft of his mine on the road below Lower Springs, that to look at would cure sore eyes. All of the rock was sprinkled with gold. He also showed us rock taken out after the last shot, which was wired and hung together with gold, the "ore" sticking out in chunks. The ledge is 2½ feet wide. The shaft near the road is down about 30 feet. The mine is near the White Oak, and is one of the most promising mines of the camp. Milt Cunningham and Burt Wiser are interested in the mine. Hart's is the only mill running along the river just at present and the ore buckets come down from the mine in endless procession laden with ore to feed the thundering stamps. The mine is one of the best bullion producers in Old Diggings. The Hidden Treasure mill was to start up this week. Supt. Kermeen has moved the old 10-stamp Mad Ox mill to the mine. They have some good ore on the dump. Simoni has advanced his tunnel in 300 feet in hard rock. He will run in 800 feet and if it reveals what is expected the 10-stamp mill will be moved down on the creek. Hull, Murray and Conroy are in about 150 feet on their promising mine on the divide north of Shasta. Mining experts declare it is going to develop into one of the best mines in the State. They have a body of ore now nine feet wide which assays $5 to $1500 per ton. Mining men from below are up inspecting the property. Work has been resumed on the Minnesota or Levi mine on the north side of Spring creek about six miles from Shasta. The Minnesota is beyond doubt a great mine. Dissensions among the former owners have kept the mine tied up for some time, but we understand the new company intend to put up a 10-stamp mill to supplant the old dry process works put in by Parmlee, and work the mine in earnest. The tunnel is in about 800 feet, showing an immense amount of milling ore. The ledge varies from five to nine feet wide being about the latter width at the breast of the tunnel. The Gladstone management are rapidly getting their new chlorinating works in working order, and load after load of machinery has gone up to the mine. The company purchased a 10-stamp mill in Idaho some time ago and are putting it up at the mine. The Uncle Sam's 30 stamps are still thundering away pounding out the "yaller stuff." The Uncle Sam is the boss bullion producing mine of northern California, and Supt. James is increasing the capacity of the mill. A Huntington mill from Sierra is to be put at the Uncle Sam which will be equal to ten additional stamps. They have ore enough in sight to run the mill ten years. Jim Dawe is working a small force of men on his mine near Shasta. He is in 40 feet on the vein and has run a 76-foot crosscut, and is opening the mine for the inspection of capitalists. Some exceedingly rich galena ore was struck in the mine lately. The Flat creek and Copley country is beginning to wake up a little. They have some good mines there but no capital is "what's the matter." Around Italian John's place are several promising claims. Dan McCarty owns a ledge there that is mighty liable to develop into a bonanza, judging from samples taken from it. Mr. McCarty has until lately been working some men on his mine. Chas. Thistlethwaite, who owns claims near by has been talking of putting up a mill. Mr. Fitch, who purchased the Drury mine is expected up soon to see about the mill, which they intend to put up here.

PAYMENT ON MINE.—*Democrat:* Representatives of the Chicago company who have purchased the Quartz Hill mine from T. J. Harrison, Steve Meeks and Bob Lyons, were here last week and on Friday made a $10,000 payment on the deal, and will pay the balance in six and nine months. This mine sold for $36,000, which gives the former owners, who have stuck to it for so many years, a handsome stake. Quartz Hill is an enormous body of milling ore, with high-grade streaks. The new company will spend considerable money developing it, and will ultimately erect a large stamp-mill on the property.

THE INTEGRAL.—*Democrat*, Sept. 6: A. B. McCaw, president of the Integral Quicksilver Mining Company, says the company's property is developing wonderfully, and regular shipments of quicksilver are now being made. The company has five miles square of patented ground, including three whole sections they purchased from the railroad company, for which they have a government patent as well. This company is destined to develop into the most extensive quicksilver producing property on the Pacific Coast. Their patented claims completely surround the ground owned by the old Altoona Company, which has been in litigation for almost 20 years. The Integral Company is a rich syndicate and possessed of the means to develop this extensive quicksilver lode.

A FINE PROSPECT.—Jim Hill and Young Wiser's claim on the old Shasta road, this side of Lower Springs, is opening very encouragingly. The shaft is now down about 25 feet alongside the road. They have a well-defined vein 2½ feet wide, and on the footwall there is hand mortar rock, some of which hangs together by strings of gold. The remainder of the ledge is good milling ore. It certainly is a fine prospect.

AT FLAT CREEK.—*Courier*: There is much life in mining matters on Flat creek. The Minnesota people have quite a force of men at work, and are preparing to put in their ten-stamp mill. H. L. Shannon is pushing work on his property. He expects to have his mill running in a few weeks.

Siskiyou.

DOWN TO BEDROCK.—Yreka *Journal*, Sept. 13: The miners are getting down to bedrock at the American Bar mine, Klamath river, below Hornbrook, or about eight miles from Yreka in an air line, having struck the rim. The claim is now yielding about $225 a week, enough to pay working expenses; but very rich pay is expected when the bed of the channel is reached, where the bulk of the gold is generally found. . . The gravel at present taken out of the Greenhorn mine, about a mile south of Yreka, is yielding good returns, and the prospects indicate a still better yield as work progresses, and a better supply of water is obtained during the winter months for putting a larger force of men at work. . . The Schroeder quartz mine on Deadwood mountain, in McAdams' Creek mining district, is still paying handsomely, with operations continued day and night. The clean-ups are made every three or four weeks, and the results appear very satisfactory to Mr. J. H. Schroeder, the enterprising owner. . . The quartz mines at Butteville district on the head of Shasta river, west of Igerna, still continue to prospect well as the work of sinking down progresses. Dale & Kiernan's ledge shows a width of two feet all the way down as far as the shaft has been sunk, with the quartz increasing in richness the deeper they sink. This camp is destined to prove one of the best quartz mining districts in Siskiyou county. . . Parties have been inspecting the old Spencer quartz mining claim on Humbug, and are now in San Francisco organizing a company to work it. This claim has been one of the best paying mines in the Humbug Creek district, and will no doubt turn out well again if worked in a scientific manner. . . Gould is busily engaged in getting out quartz from the Hegler & Aldrich quartz mine on Humbug, which he has bonded for a company below, and finds very good prospects to indicate a purchase within the time stipulated. . . The Boyle quartz mine, on the head of the North Fork of Humbug creek, is now being worked constantly with good success, and will no doubt yield average clean-ups this season as any former year, or probably better, as there has been a better supply of water than usual.

Yuba.

MINES IN EMBRYO. — Marysville *Democrat*, Sept. 12: Many times the *Democrat* has directed attention to the almost positive indications of wealth existing in the quartz veins and lodes that are to be found in the upper part of this county. This writer has, during the past 30 years, had occasion to visit every section, traveling from place to place over every road where teams can go in safety, and during such trips has taken notes and made examination of mines, mining and many prospect places, during a recent visit to Camptonville and other points inquiry was made of several settlers who have resided in that part of the country many years, and they report considerable activity in prospecting and developing quartz lodes. The surface of the earth in many places contains quartz, gravel and float rock bearing indications of mineral, and in some cases free gold. Near Camptonville, where the surfaces has been washed away and where the bedrock is exposed, there are numerous small veins of quartz to be seen, and almost invariably their course is the same. The gold taken from these mines by washing the earth was of the class known to exist in decomposed quartz, and in many cases the precious metal was found attached to quartz rock. One quartz lode, which is well defined, is now being prospected a short distance from town above the flat, where millions have been extracted by the surface and hydraulic process, and there is every indication that the owners will in time be rewarded for the labor and expense. Another one is well developed that is called the "Honeycomb," and there is no longer a doubt of its being good property. One other company, which has had some troubles to contend with in raising the water, is about to commence work on a tunnel at the base of the hill on the south, and will run it until the lode is reached, at a depth of nearly 400 feet. This will not only drain the present works, but will be the means of developing one or more lodes, as it will pass through grounds where veins of quartz are numerous. There are many indications of wealth in these places, and it seems strange that they have not received attention by prospectors long ago, when the expenditure of a few dollars and a little labor may bring them a bonanza.

NEVADA.

Washoe District.

COMSTOCK OPERATIONS.— The Consolidated California & Virginia mine continues to yield the usual amount of good ore. That extracted during the week ending September 9th included 28 tons, assaying $27 per ton, from narrow streaks that are being followed 75 feet above the sill floor of the 1500 level, and 406 tons, assaying $34.58 per ton, from openings 52 feet below the 1650-foot level. A total of 477 tons of ore, averaging $34.58 per car-sample assay, was shipped to the Morgan mill. The amount of ore milled during the week was 400 tons, and the average battery assay of the same was $28.43 per ton. A few miners are being kept at work in the Ophir, Mexican, Union Consolidated, Sierra Nevada, Best & Belcher and Gould & Curry mines. There are no changes in the condition of these mines. In the Hale & Norcross mine, on the 1300 level, the new winze was sunk nine feet during the week; total depth, 17 feet. The superintendent reports that this winze continues all in ore of very good quality. There was extracted from the winze last week 37 cars of ore, the average assay of which was $45.15 per ton. In the Potosi mine the west crosscut from the south drift, 220 feet south of the shaft, 850 level, is out 26 feet; face in porphyry; have been making some repairs to the south drift during the week. The south drift on the 16th floor, above the 900 level, was advanced 18 feet during the week; total length, 36 feet; face in ledge matter containing occasional bunches of good ore. The south drift from the east crosscut, 73 feet above the 930 level, is out 30 feet; face in porphyry and low-grade quartz. Extracted and sent to the mill the past week 319 tons and 700 pounds of ore from the 1000 and 1150 levels; milled during the week 360 tons; on hand at mill 92 tons and 1400 pounds; average battery assays, $23.74; average car-sample assay, $23.77. Shipped to United States Mint, Carson, 648 pounds of crude bullion. During the week the usual prospecting was continued in the Yellow Jacket mine and about 20 tons of fair-grade ore taken daily from the 300 and 1100 levels. Thursday night seven men were drafted from the mine, leaving but four working underground.

ARIZONA.

ACTIVITY IN NEW DISTRICT.—Hugh McCrum, who has been making his headquarters at Prescott and is mining about 22 miles from there, the other day told a *Chronicle* reporter that his location is in the chaparral district, on the eastern slope of the Bradshaw mountains, on the Black Canyon stage road toward Phœnix. This is a new district in Yavapai county, and Mr. McCrum says that a number of Colorado men and others have lately located and bought claims there, and that it gives abundant promise of becoming one of the richest districts in the West. The mines in which he is largely interested are those of the McCrum Stamping and Milling Company. His has a Huntington mill at work, which he took down several months ago, and says the property is turning out very satisfactorily. Charles M. Clark, a well-known coast mining man, is the manager. "I never saw a district turn out better," said he, "and I have frequently visited all the mining camps of the Pacific Coast in all stages of development. Gold is found almost everywhere there, and in most of the claims now being worked a handsome profit is resulting to the owners. John S. Jones, who is in Chaparral gulch near me, has a five-stamp mill going and his property is proving exceedingly rich. He cleaned up a little short of $5000 in 14 days recently. Judge Wells, McCabe, Parsons and others have about completed a new mill a mile and a half distant from my works. Several other mills will be constructed soon. A large number of prospects have recently been opened and they have all proved to be rich. I look for a big crowd of people in the district. You have no idea how many men from the Rocky mountains hitherto engaged in silver mining are now investing there and elsewhere in Arizona in gold properties. Everybody wants gold mines and nobody wants silver.

FROM THE HASSAYAMPA.—*Journal-Miner*, Sept. 6: Judge Abner Wade came in yesterday from his King Solomon mine on the Hassayampa. He says that with all the rainfall which has occurred throughout the country he has not been able to secure sufficient water to start up his mill yet. He has everything in readiness to start up just as soon as a water supply can be obtained. Connor & Munkittrick have a lot of ore ready for shipment from their Ajax mine in Eureka district. W. O. O'Neill yesterday made a shipment of a block of onyx weighing 4670 pounds. It was shipped to New York. A $4000 bar of gold bullion was shipped, a few days since, from the Yarnell mine. There are between 50 and 60 men employed now in this camp. Hugh McCrumm came in from his camp at the Silver Belt on Saturday evening on his way to San Francisco. He had quite a respectable-sized bar of gold bullion with him, the result of a recent clean-up of his mill. Mr. McCrumm announced that he had quit purchasing ore. He has recently taken a bond on five claims belonging to Tifton & Lang, and on four belonging to Henry Lang—nine claims in all—and expects to be able to get more than enough ore from them to keep his mill running all the time. During his brief absence his mill will be in charge of Mr. Johndrew who will work a lot of ore in it from his own claims. Mr. McCrumm has shown great enterprise in his mining operations, and he is assured of success. If this section of Arizona had a few more men of his pluck and enterprise, such an era of prosperity would be inaugurated as has not been dreamed of.

COPPER WORKS TO RUN.—*Silver Belt*, Sept. 2: The recent meeting between Supt. Berray of the Old Dominion Copper Co. and employes was for the purpose of announcing a reduction of wages, made necessary by the heavy decline in the price of copper Mr. Berray stated, in a few words, that the company proposed a reduction of 25 cents in the wages of men who had been receiving $3.25, and that the pay of all those receiving more than $3.25 would be cut ten per cent. If the men accepted the reduction, more coke would be ordered and work continued. If not, the supply of coke on hand would be used up and the works closed down. It required only a few minutes for the men to arrive at a decision. They took the sensible view of the situation, and announced that they would go to work, realizing the prostration of mining everywhere throughout the West, and the difficulty of procuring work. Since last week there has been a further decline in copper (to $9.40@9.50 for Lake), but it is not likely to change the determination of the Old Dominion Company, as it is semi-officially reported that operations here will continue regardless of any fluctuations likely to occur in the price of copper. There are at this writing over 800,000 pounds of coke between Willcox and Globe.

IDAHO.

MINE LEASED.—Wardner *News*, Sept. 2: The Stemwinder mine has been leased to Messrs. Hughes, Sullivan, Glass and Dorsey. They commence operation to-day with a force of ten men, which will shortly be increased. The lessees extract the ore and load the tramway; the owners of the mine will mill the product.

NEW MEXICO.

PROSPECTING FOR GOLD.—*Southwest Sentinel*, Sept. 5: There are quite a number of prospectors out in the Burro mountains looking for gold. There is gold in nearly all of the gulches in that part of the county and some of the lucky prospectors may find a ledge which will make the Burros a big gold camp. The Pacific Gold Company is doing nothing at Pinos Altos but keeping the water pumped out of the mine. This looks as though the company did not intend to abandon the mine, but aside from this there is nothing to indicate whether the company intends to resume work or not. If lead continues to advance in price as it has during the past few weeks it will not be long before the mines at Cook's Peak will be in operation again. There are thousands of tons of lead ores exposed in the mines there and enough development work has been done at the camp to make it possible to work several hundred miners there to advantage. A fair price for lead means lively times for Cook's Peak. Some time ago it was reported that the Manhattan Gold Mining and Milling Company and the

Pacific Gold Company had agreed to pipe water to Pinos Altos and move the mills from this place to the mines there. No confirmation of the report can be obtained and it is more than probable that no such arrangement has been made. The cost of the undertaking would be great but the companies would save the entire amount in freight on ore within a year. It would be the best investment ever made by mioing companies in the Pinos Altos district. There will not be much work done in the silver mines in Grant county during the rest of this year. There is no prospect of a materially higher price for silver and the mines cannot be worked with silver at the present figures. Some silver will be produced from mines which produce gold principally and some of the richest silver mines will be worked on a small scale. Mine-owners generally do not consider it good policy to work out their mines and make little or no profit on the ore mined. They prefer to let the mines remain idle and trust to future legislation for better prices for the product of the silver mines. Hundreds of men would now be employed in the silver mines of this county if a dollar an ounce could be obtained for silver, but as it is, many of the men who have been employed in the silver mines will leave the country. The Montana tunnel is now in 790 feet and there are indications that the ground will get easier to work in a few feet more. It is thought that the vein will be reached before the expiration of the present contract which is to complete 829 feet of the tunnel. The tunnel is now considerably longer than the estimated distance to the vein when the work was commenced. The tunnel is perfectly dry, the water which was struck some months ago in it having completely dried up, and the water to supply the boiler has to be obtained from the Pacific mine. When water was first struck in the Montana tunnel it was thought that the flow might become sufficient to supply a mill if the water should be allowed to settle after it had been once used and then pumped back and used over again, but the prospect of a water supply from the tunnel is not very good now.

OREGON.

Bushel of Nuggets.—Baker City *Democrat*, Sept. 4: One of the most remarkable placer gold products seen in this city for some time is on exhibition at the First National Bank; remarkable from the coarseness of the gold and the numerous nuggets. The clean-up is from the Elk Creek diggings, near Susanville, Grant county, owned by Horace W. Sloan and N. C. Haskell, and amounts to a little over $5000. In one tray was shown gold nuggets of all sizes and shapes, the largest weighing $375; another $142.50, and a third $113.75, and many weighing from $30 to $40. This neat product of gold is from a strip of ground worked during the past 30 days which measures 65 feet wide, 145 feet long, and with an average depth of about 15 feet. The process of working is by hydraulic, and a steam derrick is used for the handling of the heavy bowlders that are encountered. These diggings have been worked many years by Messrs. Sloan and Haskell, but this season's clean-ups have been larger than ever, and the $375 nugget now on display at the bank is the largest ever found in the claims. The operation of these placers will continue for several weeks yet this season, ths water supply holding out beyond all expectations.

To Develop the Pyx.—Baker City *Democrat*, Sept. 4: One of the valuable gold properties of the Robinsonville district is the Pyx mine, discovered about three years ago and owned by Messrs. Cal. Berry and Chas. Collier. This property has been considerably developed, and such a showing has been made as to attract capital toward it. A few weeks ago Messrs. Berry and Collier bonded the property to some Montana capitalists, and arrangements are now being perfected to develop the property in a scientific manner. Hoisting machinery has arrived at the mine and is being put in place. The holders of the bond on ths property are to sink a deep shaft and at a certain depth run a shaft 100 feet each way on the vein. This done, they are to take the property at an agreed consideration or forfeit all development work. The Pyx is said to be a fine showing, and there is little doubt of its development into a permanent ore-producer.

Cleaning Up.—Jacksonville *Times*, Sept. 9: The Sterling Mining Co. is engaged in cleaning up, and the prospects for a good yield are excellent. The Ashland Mining Co. has suspended operations with its Burleigh drill until water becomes more plentiful, after having progressed 250 feet. The Jacksonville Mining and Milling Co. will hold a meeting on the 15th inst., to decide what they will do in the future. A ledge has been struck, but of what value and extent its future developments must decide. A. W. Stnrgis, of Jackass district, who owns one of the best placer mines in the State, has done well during the past season. The gold cleaned up was sold at Beekman & Reames' bank and amounted to about $17,000. Mr. Stnrgis is still engaged in cleaning up the work done with the hydraulic last winter and spring.

UTAH.

Rich Silver Find.—Park City *Record*, Sept. 9: Morris Dusseldorf, superintendent of the Comstock mine, located in Thaynes' canyon, came into the *Record* office Tuesday morning and displayed a cigar box full of ore, the looks of which would cure the sore eyes if silver was only what it should be. It is really fine ore, and an assay certificate shows it to run over 280 ounces in silver and $11.28 in gold. Mr. Dusseldorf says the ore is from a vein crossed in the old workings of the property but which was never followed. He has had several men at work for some time opening up the vein, and to-day in the bottom of the drift run on the same, the vein shows a width of nearly four feet and is loaded with clean ore, there being very little waste. He feels highly encouraged and thinks the Comstock company, which has recently been reorganized and placed on a strong footing, is in a fair way to open up another bonanza like the Crescent was in its earliest days, and is positive that the vein he has opened up will prove strong and go to the deep. The Ontario Company shipped this week 41 bars of bullion containing 22,960.14 fine ounces of silver. It is learned through Mr. Daly that only a force of six men are employed at the Daly West, and that work is being confined to sinking a winze on the vein. No ore is being hoisted and no steam has been raised in the boilers of the Daly West plant, and the old Daly No. 2 shaft is being used by the men in going to and returning from work. The machinery is being overhauled and the timbers in some parts of the mine repaired. No definite policy for the future has yet been decided on. W. S. Tolles and C. H. Gitsch left on Tuesday last for a several days' prospecting trip to the headwaters of the Bear river. Mr. Gitsch was over in that section some ten years ago, and in the short time he had at his disposal then he found enough indications of gold to convince him that the precious metal could be found in paying quantities if thorough prospecting could be done. Sec and James Snyder and Henry Staoley, fully equipped for a six weeks' trip in the mountains, left Tuesday last for a prospecting trip into the northeast corner of the Territory. The boys have some information concerning rich float found in that section, and are going to make a thorough investigation. Another party, headed by Martin McGrath, are making preparations to take the trail for nearly the same part of the country, and gold is the loadstone that attracts them. If there is any gold in that country, and many believe there is, it should be found before the storms of winter come on, for several of the parties looking for it are determined and experienced men, and hardly know what it is to lose hope.

Market Reports.

The Markets.

San Francisco, Sept. 14, 1893.

The silver market during the week has maintained an even tone, though sellers have been disposed to increase their asking prices. The range of quotations has been very small. Last Monday there were offered for sale to the Treasury Department 236,000 ounces of silver at .754 to .76, and of the amount 11,000 ounces were accepted at .754.

The Metals.

The recent feature of the metal market has been the rise of lead. The quotation was recently $3.20, but it has now advanced to $3.90, and the market is reported very firm. The point at which lead-silver mines may be operated at a profit has been passed, and there is a movement among them to resume operations. Copper is still very low. Tin is much stronger than recently, quotations having advanced in less than two weeks from $19.30 to $20.20.

Coins of 1893.

The face value of the coins made at the United States Mints in August and for the first eight months of the calendar year will be found annexed:

	For August.	Jan. 1 to Aug. 31.
Double Eagles	$2,500,000	$12,798,760
Eagles	1,287,400	6,219,620
Half Eagles	573,400	1,963,520
Quarter Eagles	.....	75,132
Standard Dollars	.....	1,455,465
Half Dollars	504,000	1,039,738
Half (Columbian) Dollars	.....	2,928,052
Quarter Dollars	133,000	1,691,550
Quarter (Columbian) Dols	.....	10,008
Dimes	87,000	507,046
Five Cents	84,900	465,363
Cents	20,900	302,213
Total	$5,120,600	$28,554,380
In 1892	4,427,020	34,241,432

Most of the decrease for the year has been in Eagles, Half Eagles and Standard Dollars.

Silver and the Metals.

New York, Sept. 14.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.	Copper.	Lead.	Tin.
Thursday	34	73⅝	9 62½	3 85	19 80
Friday	34¼	74⅛	9 62½	3 85	19 80
Saturday	34⅛	74⅞	9 62½	3 85	19 80
Monday	34⅛	74⅞	9 62½	3 90	20 10
Tuesday	34⅛	74¾	9 62½	3 90	20 10
Wednesday	34¼	74¾	9 62½	3 90	20 20

San Francisco Metal and Coal Market.

ANTIMONY.		QUICKSILVER.	
Per lb	— @ 13	Home trade, pr. flask	40 00 @40 50
BORAX.		STEEL.	
Refined, in car lots	— @ 7⅞	English, lb	— @ 18
Powdered, do	— @ 7⅞	Canton tool	— @ 8¼
Concentrat'd, do	— @ 6⅞	Bl'k Diam'd tool	8½@ 15
All grades jobbing at advance.		Pick & Hammer	6½@ 10
COPPER.		Machinery	4 @ 5
Bolt	23 @ —	Toe Calk	— @ 4½
Sheathing	23 @ —	PIG TIN.	
Ingot, jobbing	— @ 20	Spot ₱ lb	21½@ 22
Do, wholesale	15 @ 15	COAL.	
Fire Box Sheets	22 @ 24	SPOT FROM YARD—PER TON.	
IRON.		Wellington	$8 00
Bar, base	— @ 2½	Greta	7 50
Norway, base	— @ 4½	Nanaimo	6 50
PIG IRON.	Spot.	Gilman	5 00
Eglinton ₱ ton	—@—	Seattle	6 50
Glengarnock	27 00@—	Coos Bay	5 50
Am. Soft, No. 1	25 00@—	Cannel	9 00
Shotts No 1	27 00@—	Egg, hard	12 00
Puget Sound	—@—	Wallsend	7 25
Clay Lane White	30 00@—	Scotch Splint	8 00
Langloan	27 00@—	Brymho	7 50
Gartsherrie	27 00@—	West Hartley	7 50
Barrow	—@—	TO LOAD—PER TON.	
Cargofleet	—@—	Australian	6 50@—
LEAD.		Liverpool Steam	6 87@—
Pig	— @ 4½	Scotch Splint	7 00@—
Bar	— @ 5	Cardiff	7 00@—
Sheet	— @ 5	Lehigh Lump	10 00@—
Pipe	— @ 5½	Cumberland	9 50@—
SHOT.		Egg, hard	9 00@—
Drop, sizes *smaller* than B, ₱ bag of 25 lbs	$1 75	West Hartley	7 50@—
Do do, B and *larger* sizes ₱ bag of 25 lbs	2 00	COKE.	
Buck, Ballsand Chilled do, ₱ bag of 25 lbs	2 00	English, to load	$9 50@10 00
		Do, spot, in bulk	—@12 00
		Do, in sacks	—@14 00
		Cumberland	9 50@—

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.

ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Alpha M Co, Nev	60	25c	July 31,	Sept 4, Sept 25	E B Holmes, 309 Montgomery
Amador G Mine, Cal	1	5c	Sept 7,	Oct 12, Nov 7	F E Luty, 330 Pine
Bay State M & Dev Co, California	15	2c	Sept 26,	Sept 28, Oct 25	A J Coster, Plymouth, Cal
Belcher M Co, Nev	45	25c	July 31,	Sept 4, Sept 25	C L Perkins, Mills Bldg
Bodie Cons M Co, Cal	16	15c	July 24,	Sept 25, Oct 24	M E Willis, 309 Montgomery
Bodie Tunnel & M Co, Cal	17	10c	Sept 5,	Oct 7, Oct 24	Chas C Harvey, 309 Montgomery
Brunswick Cons G M Co, California	6	2c	Sept 4,	Oct 6, Oct 24	J Stadtfeld, 56 Nevada Block
Bulwer M Co, Cal	8	10c	July 29,	Aug 31, Sept 22	L Osborn, 309 Montgomery
Carnuelo and and Coal Co, Cal	6	2c	July 21,	Sept 1, Sept 20	R McDoble, Mills Bldg
Chollar M Co, Nev	35	10c	July 31,	Sept 5, Sept 26	C E Elliott, 309 Montgomery
Clinton M Co, Cal	2	15c	Aug 9,	Sept 16, Oct 2	C E Gunn, Mills Bldg
Confidence S M Co, Nevada	23	25c	Aug 7,	Sept 11, Oct 2	A S Groth, 414 California
Do a Gold Mining Co, Cal	1	5c	Aug 25,	Sept 25, Oct 25	Chas J Blumenthal, 415 Montgom'y
Eclipse M Co	5	2c	July 27,	Sept 4, Sept 25	O Tum Suden, 216 Bush
Evening Star M Co, Cal	10	1c	Aug 9,	Sept 12 Sept 30	J J Scoville, 320 Sansome
Exchequer M Co, Nevada	36	1c	June 29,	Aug 31, sept 21	C E Elliot, 309 Montgomery
Gray Eagle M Co, California	33	3c	July 10,	Sept 6, Oct 4	Chas C Harvey, 309 Montgomery
Herold M & M Co., California	6	1½c	Aug 10,	Sept 16, Oct 3	M E Willis, 309 Montgomery
Iuyo Marble Co, Cal	21	5c	Aug 8,	Sept 12, Oct 12	W W Sargeant, Mills Bldg
Jackrabbit M Co, Cal	4	5c	Aug 10,	Sept 15, Oct 6	Thos Wetzel, 320 Sansome
Justice M Co, Nev	55	10c	July 31,	Sept 5, Sept 25	R E Kelly, 309 Montgomery
Martin White M Co, Nevada	29	25c	Aug 31,	Oct 26, Dec 14	K L Ross, 12½ Sutter
Ophir M Co, Nev	60	25c	July 31,	Sept 4, Sept 25	E B Holmes, 309 Montgomery
Orleans M Co, Cal	13	2c	Aug 29,	Oct 9, Oct 31	Geo P Thurston, 575 Mission
Overman S M Co, Nevada	68	5c	Sept 1,	Oct 5, Oct 26	Geo D Edwards, 414 California
Potosi M Co, Nev	39	25c	Sept 11,	Oct 16, Nov 7	Chas E Hillyer, 309 Montgomery
Sag Belcher and Mides Con M Co, Nev	12	10c	July 25,	Aug 29, Sept 18	E B Holmes, 309 Montgomery
Sierra Nevada S M Co, Nevada	105	20c	Aug 2,	Sept 5, Sept 25	E L Parker, 309 Montgomery
Siskiyou Cons Quicksilver M Co, Cal	7	1c	Aug 29,	Oct 5, Oct 27	Edw F Stone, 306 Pine
South Eureka M Co, Cal	5	1½c	Aug 2,	Sept 4, Sept 29	A Halsey, 338 Montgomery
Teresa M Co, Mex	11	10c	Aug 9,	Sept 11, Sept 27	R J Willats, 8 9 Market
Tirakali S M & M Co, California	10	1c	Aug 18,	Sept 23, Oct 19	W J Gurnett, 308 Pine
Utah Cons M Co, Nevada	19	5c	Sept 1,	Oct 4, Oct 25	A W Havens, 309 Montgomery
Ventura Asphalt Co, Cal	1	5c	July 11,	Aug 26, Sept 18	F. A. Brooks, Monty Block
Waterloo G M Co, Cal	1	15c	Aug 2,	Sept 6, Sept 25	J M Bailey, 18 Post
Yellow Jacket M Co, Nev	55	25c	July 29,	Sept 5, Oct 9	W H Blauvelt, Mills Bldg

MEETINGS.

Company and Location.	Meeting.	Secretary and Office in S. F.	Date
Belle Isle M Co	Annual	J W Pew, 310 Pine	Sept 28
El Carmen de San Vicenti Cons M Co	Regular	J N E Wilson, Pres, 401 California	Sept 21
Mono G M Co	Annual	M E Willis, 307 Montgomery	Sept 21

The Stock Market.

San Francisco, Sept. 14, 1893.

Pending settlement of the wage dispute on the Comstock the mining share market is exceedingly dull. Besides, business was interrupted during the week by the occurrence of Admission Day and of a Hebrew holiday Monday. At its regular morning session Friday, for the first time in the history of the San Francisco Stock and Exchange Board, not a sale of Comstock shares was made. The bidding prices, however, indicated that the market had a steady tone.

For the month of August the Consolidated California & Virginia mine made about $14,000 over and above its expenses, and has a surplus in the treasury of about $57,000. Regular shipments of ore to the Morgan mill will be made all this month, and good results are also expected.

Potosi has levied an assessment of 25 cents per share. The monthly bullion statement of the Potosi for August is as follows: Worked at Nevada mill 1600 tons of ore; gross proceeds in bullion, $34,170.22; cost of reducing, $9600; net proceeds in bullion, $24,570.22; assay value per ton, $16.15; gross average per ton, $21.35; net average per ton, $15.35; mill worked 81 per cent.

List of U. S. Patents for Pacific Coast Inventors.

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For week ending August 22, 1893.

503,759.—Tree Protector—E. H. Black, Campbell, Cal.
503,899.—Fruit Drier—A. H. Carson, Grant's Pass, Ogn.
503,852.—Windmill—C. W. Clarke, Hanford, Cal.
503,593.—Motor—Grass & Hardie, Lassen, Cal.
503,785.—Amalgamator—J. S. Johnson, S. F.
503,655.—Crosscut Saw—J. B. Keily, Pleasant Home, Ogn.
503,787.—Bushing and Faucet—O. H. Merrick, S. F.
503,384.—Milk Cooler—F. J Merz, Seattle, Wash.
503,666.—Faucet—F. M. Mott, Perris, Cal.
503,752.—Fringe Holder—J. M. Schlesinger, San Jose, Cal.
503,754.—Car Coupling—W. E. Steffsy, San Diego, Cal.
503,820.—Oven Door—Webster & Hamilton, Pine Grove, Cal
503,830.—Hammer—C. Weigant, Portland, Ogn.

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Thursday, September 14, 1893.

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100 Con. Cal. & Va	1.35	50 Savage	35c
100 Gould & Curry	25c	35 Union	30c

2:30 P. M. SESSION.

100 Mexican	50c	150 Sierra Nevada	40c
100 Occidental	45c	50 Union	30c
50 Ophir	80c	100 Y Jacket	45c
50 Potosi	35c	100	40c

Pacific Stock Exchange.

9 AND 10:15 A. M. SESSIONS.

100 Hale & Norcross	48c	50	33c
100 Overman	8c	500 Potosi	35c
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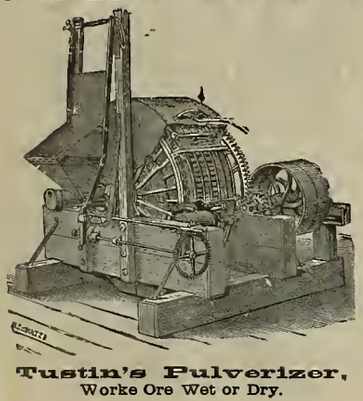

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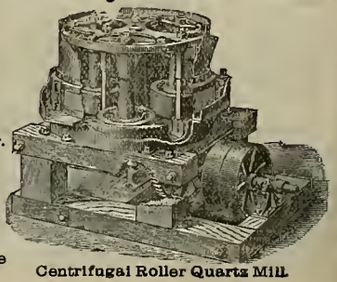

Centrifugal Roller Quartz Mill.

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VOLUME LXVII.
Number 13.

SAN FRANCISCO, SATURDAY, SEPTEMBER 23, 1893.

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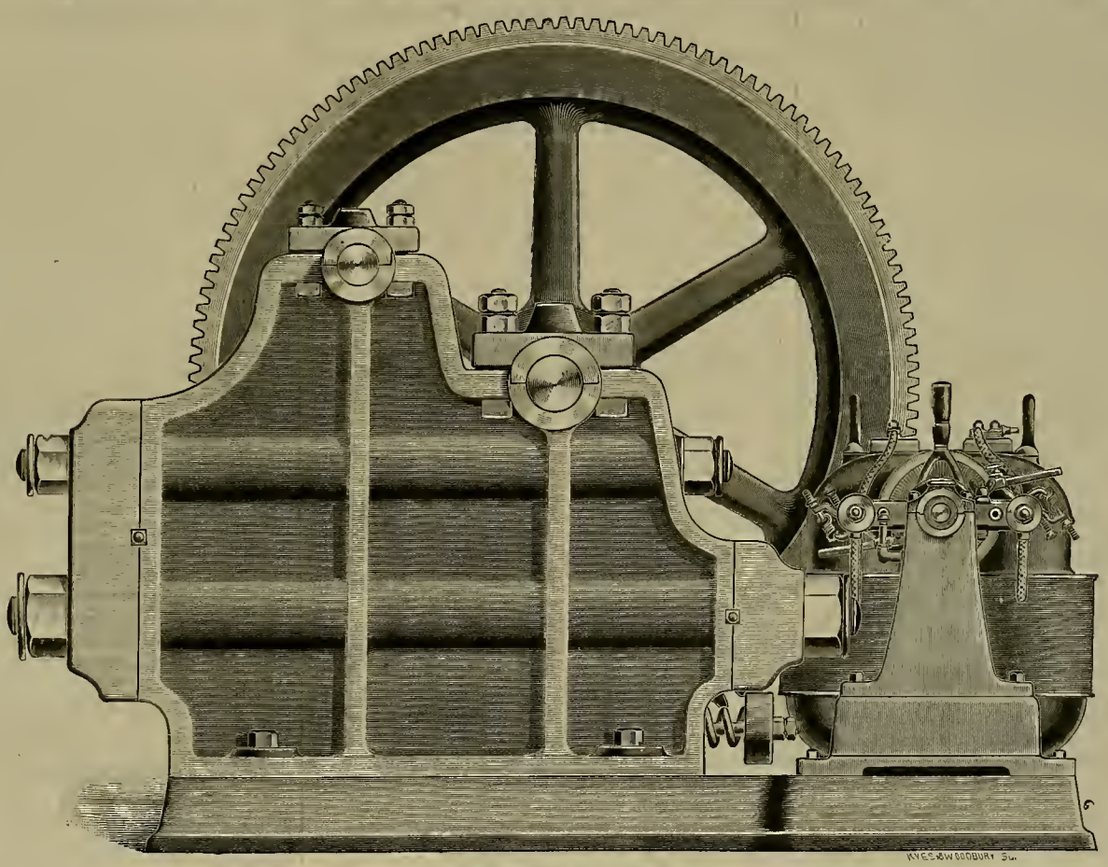
Electric Rock-Breaker.

On this page is presented an illustration of a rock-breaker of the Blake type, with dynamo attachment, as provided by the Thompson-Houston Electric Company, of Boston, Mass. The breaker is shown geared directly to the electric motor, all being mounted on the same bed-plate. The rock-breaker is shown with one flywheel off. The other wheel is fitted with a gear having cut teeth. An effective safety device in the form of a breaking plate, which is easily and quickly replaced, is fitted to the rock-breaker pitman, which will prevent any unusual or extraordinary strains due to foreign matter getting into the jaws, damaging either the rock-breaker or motor.

The gears and motor are encased so they can suffer no injury from flying rocks or dust, and are not a source of danger to the operator. The extreme compactness and simplicity of this machine will commend it to mill and mining men, road masters, contractors and others having use for such machines where electric power is available.

These motors are built of from 5 to 15-horse power, the capacity of the crushers ranging from 4 to 14 tons per hour. The complete weight of crusher and motor with the 5-horse power is 3800 pounds, and with the 15-horse power is 21,000 pounds.



ELECTRIC ROCK-BREAKER.

E. J. Ladd, an Oregon prospector who has been working in Josephine county, tells how by patience and perseverance he succeeded in tracking a three-foot vein of gold-bearing quartz, near the summit of a mountain. Float quartz had long been found in a creek at the foot of the mountain. Colors could be obtained by working dirt from its side, and prospect holes have been sunk in many places. Mr. Ladd went up the side of the mountain above all the prospect holes and kept taking dirt, three pans at a time, down to the creek and washing it till he got so far up that he could not find a color. Then he went back to the last place he had found gold and commenced to dig, and when he had gone a few feet he struck a three-foot vein of gold-bearing quartz. He thinks he has struck the proper plan for locating quartz ledges.

Judge Hawley, in the United States Circuit Court for Nevada, on Tuesday decided in favor of the defendant in the important case of Boot & Blowey versus the Justice Mining Company. The full text of the decision has not yet been received, but several subjects of much interest to mining men appear to have been passed upon by the Judge. They include the question of what constitutes a valid location, what is a ledge, affidavit of performance of labor, general work, course of location of mining claim by employe for the benefit of corporations, etc. Among other things said by telegraph advices to be held by the Judge is substantially that a location is valid if the claim is so marked by stakes and monuments that the boundaries may be readily traced, and that it is not essential to post the notice on the ground and within the boundaries; and, if the notice is posted on the ground, it is not necessary to post at the discovery shaft. If this is really the conclusion of the Judge, it is a material revision of the requirements for the location of mining claims, and will allow departure from the present practice in this respect. The full text of the decision will be awaited with interest.

The silver question in the Senate seems no nearer to conclusion than a week since. Senator Voorhees, champion of repeal, has threatened to resort to cloture, but it is doubtful if he can or will try to carry out his threat. It is hard to tell when a vote will be reached, but the silver men now appear to be strong enough to force a compromise of some sort. It may be simply a definite understanding as to what the subsequent measure following repeal shall be.

The silver question appears to have lost much of its interest throughout the country. The Senate has talked it almost to death.

A Stamp-Stem Guide.

A new anti-friction stamp-stem guide, having several novel and useful features, has been devised by H. P. Grugin of Bannock City, Mont. The invention consists essentially in a fixed stock, having a socket through which the stamp-stem moves, and a series of anti-friction balls seated and freely movable in channels in the stock, adjacent to the socket, and bearing on the bar or stem. These balls, which are rubber, are acted upon in the reciprocating motion of the stem, and have both a rotary motion on their axes and a bodily movement in travel along the course of the channel. The diameter of the balls is sufficient to cause them to project in the socket. The advantages claimed for the guide are as follows:

Though the balls may be of any suitable material, the highest efficiency is obtained by making them of rubber, whereby they serve as cushions as well as anti-friction bearings. It makes no difference which way the stamp drops on the die, nor how refractory the quartz is upon which it falls. The cam picks up the tappet easily, the rubber balls yielding sufficiently to ease the stem, and the friction is reduced to a minimum. Friction is also avoided in the contact of the cam and tappet, as the stem turns axially and easily upon the balls in the guide, and these parts, therefore, last longer. This guide also prevents the stem from breaking at the boss-head. No guide-fastener is needed, as the device is both guide and fastener. There is no wear except on the balls, which will last a long time and may be easily replaced. There are no fasteners to break, and the consequent stopping of the mill from this cause is avoided. Mr. Grugin has applied for letters patent on his invention.

Co-operation has been successfully adopted as the method for starting several of the idle mines at Leadville, Colo. The Maid of Erin has set the example, and others are expected to follow. The plan whereby the resumption took place was an agreement between the men and the management to deduct the expenses of operating from the gross receipts and divide the net profits on a percentage mutually satisfactory. Between 50 and 100 men went to work on the first day, and should the scheme prove successful the force will be largely increased, and many idle men thus be employed.

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San Francisco, September 23, 1893.

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THE Anti-Debris Association, through its president, Mr. C. E. Stone, recently declared its confidence in the ability and character of the Debris Commission and advised farmers to let them alone; but it is apparent that this leaven of good sense and fairness will have little effect upon the mass of valley prejudice against miners, systematically excited by professional grangers. For example, we find a paper called the Wheatland *Four Corners*, in the hop center of Yuba county, solemnly declaring that the provisions of the Caminetti law are not practicable, and that "the moment the mountains of earth are torn loose down to bedrock no conceivable power within man's control will be able to cope with such a force and prevent the debris from ultimately filling up the river bottoms." It is, of course, possible that a conscientious course of inquiry into the various phases of hop culture, assisted by copious internal applications of the fermented product, may produce such a state of mind that one is able to grasp intuitively all the difficulties and point out the impossibilities of any given engineering problem. It is, therefore, very much to be deplored that the luminiferous Wheatland genius has seen fit thus to dismiss the subject with a generalization. The Government engineers think restraining works will restrain, and they are about to make the grave error of passing upon plans for various dams designed for that purpose. They are thoughtlessly risking reputations for good judgment, technical skill, and practical application thereof, gained by a long period of honorable and satisfactory service with the Government. An expedition should by all means be undertaken to the oracle of the hop fields of Wheatland, that wisdom may be learned ere it is too late.

THE PRESS is in receipt of the text of the decision of the Arizona Supreme Court in the case of the Watervale Mining Co. *vs.* Leach et al. The opinion was prepared by Associate Justice Kibbey and is interesting from the fact that it controverts the position on one important point heretofore uniformly assumed by bigh judicial authorities. The dispute in this particular case was over the interpretation of the mining laws relating to cross veins claimed by different persons who had made two locations covering the same territory. The decisions of the courts have heretofore been in such cases that the senior location is entitled to the ownership of the ore at the intersection only (besides the original vein), the junior location retaining possession of all ore in the cross vein except at this point, through which it has right of way. The Arizona decision, however, declares that the senior location is entitled to all the veins within its limits, the junior having no rights therein of any sort. Inasmuch as the apex of the cross vein appears to have been outside the lines of the senior location, we are disposed to regard the decision as more novel than sound.

Increase of Gold Output.

It is not too much to say that there is at the present time more interest and the enlistment of greater energy and more new capital in gold mining enterprises than in any other industry on the Pacific coast. Despite the dull times and the stagnation of trade and business pursuits, a general revival has taken place in gold enterprises, and there has occurred an awakening among miners and capitalists, not known since the days when the Sawyer decision was unthought of and its disastrous effects unexpected and unpredicted. No county in California that has gold in paying quantities within its borders has escaped the contagion of renewed activity and enlivened spirit, the investment of new capital, the presence of swarms of prospectors, the development of properties, the employment of more labor, and an increase in the gold output over recent years.

These statements are not idle, but can be supported by facts and figures of a convincing nature, to-wit: During the four months of 1893 ending with August the Selby Smelting and Lead Company deposited with the mint the following amounts of fine gold, received from its various depositors on the Pacific coast:

May	$ 990,733 49
June	1,372,065 28
July	1,500,653 20
August	1,355,507 96
Total	$5,219,059 93

The San Francisco mint was closed during the greater part of June and July, and practically all the product of the Pacific coast went to the Selby Works. When the mint is open, a large amount of the total product is handled by the government refinery. A monthly average of about $60,000 of the foregoing four months' receipts came from outside California, making the total receipts from this State nearly $5,000,000 for four months, or an average of $1,250,000 per month. But it must be remembered that during May and August the Selby Works handled only a portion of the output, which was in all probably about $2,900,000. Added to the June and July product ($2,872,718.48), we have a total from all Pacific coast sources of $5,772,718.48, of which about $5,500,000 came from California alone. The average production per month for this period is therefore $1,325,000. Of course the winter production is less than summer, but it seems safe to estimate fram these figures that the average monthly production in California for the current year will be $1,250,000, or a total of $15,000,000. The total for 1892 was $12,500,000. It is interesting in this connection to compare these figures with the production of former years. Since 1883 California has produced the following gold:

1883	$14,120,000
1884	13,500,000
1885	12,700,000
1886	14,725,000
1887	13,400,000
1888	12,750,000
1889	12,586,722
1890	12,500,000
1891	12,600,000
1892	12,571,000

If expectation is realized, California's gold yield in 1893 will be greater than for any year in the past decade.

These figures, while significant, sufficiently exact and eminently satisfactory, do not furnish a complete idea of the situation. There are many enterprizes now fairly under way from which no large results will be derived for some time in the future. If these enterprizes are carried to consummation, producing mines are worked to their present capacity, and none others are to be opened up for 1893 or 1894, it is safe to say that the coming will show a material increase in production over the present year.

No Settlement Reached.

Hope of immediate settlement of the miners' wage question on the Comstock was dispelled last Saturday, when the Miners' Union opened polls and voted on the proposition to reduce from $4 to $3.50 per day. More than two-thirds voted in the negative. The Mechanics' Union, which has cut an important part in consideration of the question, met the same day. A committee appointed to confer with the mine, milling, water and railroad interests submitted a report to the conference Thursday, at which the labor question was discussed. The magnates stated that reductions would be made to the general public in wood, water, transportation, etc. No guarantee was given that the mines would run any length of time provided the labor unions reduced wages 12½ per cent and that more miners would be employed. Afterward consideration of the whole matter was indefinitely postponed. The whole situation was much complicated by the action of the Gold Hill Miners' Union, which Tuesday evening declared in favor of reduction by a vote of 49 to 47.

It is to be seriously regretted that an amicable adjustment of the difficulty was not reached. The position of the miners and mechanics has been practically that they would consent to no reduction until officers' salaries came down, and other concessions relating to fuel, water, etc., bearing upon the cost of living, were made. It appears that heavy cuts in officers' salaries have really been made by a number of companies, and the definite promise of cheaper freight and fuel rates was given. Public sentiment and the equities of the case have heretofore been with the miners and mechanics. But now the owners have appeared disposed to do the fair thing and it may be seriously asked if the miners have not gone too far in the summary rejection of their offer. It is true that no satisfactory guaranty was given that more men would be employed or steady work given. But it is difficult to see just how the owners could bind themselves to such agreement in the present uncertain condition of the silver market. Matters have gotten into such shape between the owners and miners that the former will probably not hereafter be very anxious to resume negotiations, with a prospect that they will again be abruptly terminated. They went half way once and there appears to be very small inducement for them to go again.

A fair arrangement would be for the miners to consent to reduction until such time as the price of silver advances to a point of profit—the figure to be determined in advance. The freight and water concessions should be guaranteed on the part of the owners and their allies. This arrangement seems to us equitable and practicable. It must be remembered that outside of Nevada the miner's wage scale is less than $4 per day. The Comstock is no longer a bonanza either for miners, mechanics, officers or stockholders. The latter are most of all well prepared to endorse this statement.

The Gold-Mining Revival.

"I am not overstating the facts when I say that there is more activity in gold-mining operations, and a generally better feeling and more wholesome condition of things, than at any time since the beginning of the disastrous agitation that led to the suspension of hydraulic mining," said Mr. A. J. Ralston, president of the Selby Smelting & Lead Company, to a representative of the MINING AND SCIENTIFIC PRESS, Tuesday. "A marked increase in the volume of our refining business is direct and substantial proof of the improved aspect of the mining industry. The number of our depositors has recently become very much larger, and we encounter on every hand material evidence of the returning prosperity of the mines.

"The activity is the more notable because of the general business and industrial depression. It is brought about by a variety of causes, chief among which are the disposition of people in the interior to encourage gold-mining, by the dullness of other lines of metal production, by the fact that the inducements now offered to the prudent and intelligent miner are greater than ever before, and by favorable legislation looking to the resumption of hydraulic mining. Properly conducted, gold-mining is a safe and stable business, and it is now on a better and more legitimate footing than it has ever been.

"The Sawyer decision, which suspended hydraulic mining, was at the time of its delivery popular with a number of people. But public feeling has now changed, and, outside of a few who have, or think they have, interests to the contrary, is now altogether in favor of the miner. All realize what a heavy blow the loss of the product of these mines has been. The former opponents see their mistake, and many of them acknowledge it. Some of the difficulties they complained of were imaginary; others were magnified. The way is now opened to the resumption of hydraulic mining, and I feel satisfied that this branch of the industry will be rehabilitated. It may be slow work, but conditions are more in favor of the miner than for some years, and resumption seems to be only a question of time.

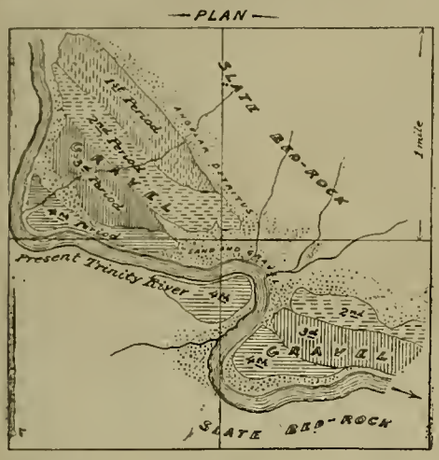
"I was much interested in some statements made to me the other day by Mr. W. S. Chapman, the well-known mining man. 'It has been demonstrated,' said he, 'that slickens is an actual benefit to the land, and not a detriment. It is a fertilizsr and adds to the wealth and the productive power of the soil. Cases have come under my own observation where shallow cultivation of slickens has yielded finely; in fact, so rich is the soil that deep cultivation makes rank products, and is a disadvantage. If people will only look at this thing as they should all objection to hydraulic mining will be withdrawn. In fact, I think the time will come when farmers will await with expectation of material advantage the season when the slickens shall come down from the mountains.'

"But to return to the subject: The gold-mining industry is, as a whole, in better shape than for many years. I am satisfied that we are fast approaching the time when the industry will be restored to something like its old-time prosperity and importance."

Trinity County Gravel Mines.

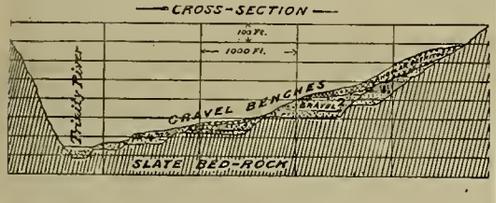
The Trinity county gravel mines are in a fortunate position as far as the debrie question ie concerned. There is no conflict with farming interests, and it does not eeem likely that tbe hydraulic miners will ever be restricted in tbeir onerations. The gravel deposits are somewhat varied in character. They cover large areas and promiee to furnish their fair ebare of the gold product of the country for a century or more to come.

Mr. Ross E. Browne, the mining engineer, furnishes ue with one of his illustrations of the manner of occurrence of the Trinity river gravels in the vicinity of Junction City. Mr. Browne describes tbese gravels as accumulatione on broad, flat benches representing dietinct periods of depoeit. In ages gone by, the river was apparently eubjected to



periodical freehete, each time changing ite couree eomewhat, cutting a deeper channel and leaving on the valley slopes limited patches of its former depoeit. In the illustration here given, there are repreeented four well-marked periods.

Theee benches are well situated for hydraulic mining, their elevation furniebing ample dumping room and grades for sluicing. Large bouldere are not especially



numeroue. There ie not much clay and no volcanic cap.

In the eection ebown the depth of gravel variee from 10 to 150 feet, and some of the benchee are dead level for a thoueand feet or more of their widthe. The greater part of the gold ie naturally contained in the bottom layere—it is well-washed river gold of medium eize and hae a fineneee (purity) of from .900 to .920.

Quite different from tbe Trinity river gravels ie the enormoue depoeit in the Weaverville baein. The latter ie mainly of angular fragments, partially rounded bouldere, sand, clay, etc., and ie doubtleee an accumulation reeulting fram glacial traneportation. It is very extensive, both in width and length, covering many equare miles, and in places its depth ie such that the present creeks of the Weaver basin have not cut down to within eeveral hundred feet of ite bed.

The main mass of this vast detrital accumulation is practically unassorted, but containe within it smaller channel courses, filled with true river gravel. In places the unaesorted mass has been teeted and found to contain gold enough to yield a profit in washing on a large ecale, but the miner with only a emall water eupply at hie command has generally preferred to confine his operations to the true channel courees within the main depoeit, relying on the concentratione prepared for him by the running streame.

An effort ie being made to induce Congrees to reviee and euepend for 1894 the operation of law requiring $100 annual work on unpatented claims, under penalty of relocation, or liability thereto, in January of each year. The silver minere who have cheerfully complied with the statute ever eince it wae enacted, twenty yeare ago, now find that it works great hardehip upon many of them. They are unable to expend the required amount. It ie propoeed to change the termination of the aeceesment year from January 1st to October 1st of each year, and to extend the period for making the annual expenditure for 1893 from December 31, 1893 to September 30, 1894. It is not, and ehould not be, the policy of the Government to exact onerous requirements of those who in good faith locate and are endeavoring to hold mining claime. The request of the minere is reasonable. Congreee should consider the depressed condition of the silver induetry and afford all needed relief.

Gold Mines of Oregon.

The minee of Oregon ehare in the recent general movement of gold properties. During the past year there hae been a very marked degree of activity in southern Oregon, and particularly in the vicinity of Aebland. New placer and quartz propertiee are being developed. Outside capital has been enlieted, many new companies formed, mills erected and minee worked.

Around Baker City, in eastern Oregon, the prosperity of the country almoet assumee the dimeneions of a "boom." Among recent enterprisee ie the propoeed conetruction of a 100-etamp mill on Big Eagle creek, where a ledge bearing ore of good grade ie to be worked. There have recently been eeveral important tranefere of mines, and it ie likely that the output of thie section will be greatly increaeed.

Union county, which has alwaye been one of tbe largeet of Oregon producers of gold, ie aleo keeping up with the proceesion. The country ie being more thoroughly proepected than ever before, and we may from now on expect to hear frequent announcements of new finde and the undertaking of new enterprises.

Several yeare ago, when eilver mining was attracting eo much attention and money, Oregon wae very thoroughly eearched for good eilver properties. Tbere were eeveral dietricts in which excellent proepects were ehown, and which were thought to be capable of profitable development; but eomehow the outpnt never amounted to very much. On the contrary, it has always been known that there was paying gold ore in the hille, and it ie surprising that more extensive development in that line hae not before thie taken place. The prospect is that the real merits of Oregon ae a gold yield will hereafter be better appreciated. The output of the State for 1892 ie officially computed at $1,491,781.39. We expect to see an increaee for 1893 that will bring the figures up to the vicinity of $2,000,000.

Foundry Notes.

Another cargo of armor plating for the Monterey and the Monadnock has been received at the Mare Island yard.

Caton's Foundry and Machine Company, of San Jose, has been incorporated. Capital stock, $50,000, with F. E. Caton, B. F. Bailey, F. B. Warring, W. B. Ruse and David Johns of San Jose as directors.

The lighthouse tender Manzanita is to be thoroughly overhanled and repaired at Astoria. Proposals for the work have been received by Captain Farenholt, the inspector, the lowest bid being $3127 for the woodwork and $1993 for the ironwork.

Rapid progress is being made at the Washington gnn foundry in the construction of twelve 13-inch rifles for the four new battle-ships nearing completion. Seven are practically complete, three are ready for testing, and the test will be made as soon as the important question of powder has been determined. These are the most powerful guns ever built for the United States navy.

Representative Hilborn has introduced a bill making an appropriation of $700,000 for a new drydock at Mare Island. The bill calls for an immediate appropriation of $150,000, and $700,000 is to be the limit of cost. Another drydock at Mare Island is needed and it wonld be an absolute necessity in time of war. The Navy Department will, at Mr. Hilborn's suggestion, recommend its construction.

Secretary Herbert has anthorized the rebuilding of the old flagship Hartford at Vallejo in accordance with a recent act of Congress. It is stated that he has anthorized the expenditure of $456,244 for this purpose, approving the entire recommendations of the Board of Construction. It is announced that orders are at hand directing that the work of reconstruction begin at once. The allotments of money by the department are as follows: To reconstruct hull, $276,000; new engines, improved marine type, $160,000; equipment, $194,000. A recent act of Congress leaves it at the discretion of the Secretary of the Navy to bnild a new vessel or reconstruct the Hartford. The above figures do not show the armament. It is generally nnderstood that just as soon as this money reaches San Francisco and is made available to the authorities at Mare Island, work on the old flagship will be commenced at once.

In an interview with a representative of the Joshua Hendy Machine Works, No. 51 Fremont street, this city, the Press was informed that notwithstanding the marked depression in trade in the nsnal and ordinary lines of machinery, yet during two months past these works have done a fair bnsiness in certain of their specialties of quartz milling and hydraulic mining machinery. They have furnished a 5-stamp mill, complete, for use in Oregon, and a complete 10-stamp mill to be operated in Shasta county, and also a 20-stamp mill erected in one of the southern connties of this State, each of the above having an entire eqnipment of all of the usual accessories for the proper milling of gold-bearing ores. In conjunction with the last-named mill they furnished a large pumping plant, comprising two Buffalo compound dnplex steam pumps of 14 and 22-inch cylinders respectively, and 18-inch stroke, successfully pumping from 6000 to 8000 gallons of water per hour through a pipe three inches in diameter and 12 miles in length, taking the water from the Colorado river and raising it to an elevation of about 600 feet, for mill-battery use and camp supply. They have further furnished a fair number of "Challenge" ore feeders for use in Mexico, North Carolina and elsewhere, and also a number of the improved form of "Triumph" ore concentrators, besides hoisting buckets and cars for mining purposes, and a large amount of tee rail and water pipe. They have also shipped for nse in British Columbia, Oregon, Montana, and other States, several plants consisting of sheet-iron pipe, water-gates, giants, etc., for hydraulic miuing, and have very recently supplied an hydraulic gravel elevator, water-lifter or pnmp, with water-gates, giants, etc., for hydraulicking in Plumas county. Their sales of boilers, engines, pumps, etc., while limited by the contraction of trade, have been considerable.

Slickens.

The Syndicate mill at Bodie is running on tailings belonging to the Bodie Con. Company.

A bullion shipment, valued at about $36,000, has been received from the mines of Candelaria, Mexico.

The Denver *Republican* prints a list of seventy-six Cripple Creek properties which are producers of pay ore.

W. W. Mendenhall of San Francisco and Frank Leavitt have resumed work in the Malone mine at Mariposa.

W. E. Sharon, superintendent of the Yellow Jacket, Belcher and other Gold Hill mines, will leave for the World's Fair.

The camp of Carson, Pine valley, Union county, Oregon, has been started. Much activity has recently been displayed in its vicinity.

The Calumet and Hecla Copper Mining Co. of Michigan has declared a dividend of $5 per share, or $500,000, payable September 27th.

The Plumas Mining and Water Company advertises that it will change its principal place of business from Spanish Ranch, Plumas connty, to Sau Francisco.

The Miners' Federatiou at Nottinghamshire, England, has decided that its members shall not return to work at the old wages, and that they will not accept an offer of arbitration.

Shingle Springs, El Dorado county, has recently assumed much activity. Several new mines are being opened and old ones reopened, or preparations to that end are being made.

It is rumored in Grass Valley that Prof. James D. Hague, the mining engineer, has bonght most of the stock in the Stockbridge mine at Rocky Bar and will proceed to develop tbe same.

Collector Wise is looking for a competent assayer, who shall receive the appointment of inspector of drugs, chemicals and medicines at the custom honse. His duties shall include the assay of ores.

The Farrell mine of San Jose has been incorporated. Capital stock $100,000, with C. D. Wright, of San Jose, and N. H. Seligman, R. Wise, Natban Roseuberg and Melvin Wise of Oaklaud as directors.

The Champion Mining Company have on tbe ground, and will have in operation very soon, the largest pumping machinery ever erected in this State, says the Nevada *Transcript*. It is a sight to look at the present works.

The largest shipment of placer gold ever received at the Denver Mint arrived one day last week. Tbere were 590 ounces of it and 240 ounces of retort gold. The Lemhi placers, near Salmon City, Idaho, prodnced the gold.

It is reported in Nevada City tbat James L. Flood and John W. Mackay will send one of their mining experts there the last of this month to examine two mines in the Nevada City mining district, with a view of purchasing tbem.

Articles of incorporation of the Buck Horn Gold-Mining Compsny have been filed in San Francisco. Directors—George W. Osborn, G. W. Osborn, Jr., I. C. Given, George W. Waitt and C. F. Bunker. Capital stock, $100,000.

The Mechanics' Gold Mining Company of Amador County, of Oakland, has been incorporated. Capital stock $300,000, with Charles J. Raleigh, Delos Pratt, Hermon A. Pratt, Frank Kings and Edwin L. Arnest of Oakland as directors.

The Stillwater Mining and Milling Company of Sacramento has been incorporated. Capital stock $100,000, with W. S. Weymonth of Drytown, George A. Holbrook, J. H. Gray, John Guslin and A. M. Cunningham of Sacramento as directors.

Owing to the low price of copper, the Copper Queen Co. at Bisbee, A. T., have found it necessary to reduce wages, and hereafter men who have been receiving $3.50 or over will be rednced 50 cents, and those nnder $3 will be reduced 25 cents.

A big silver convention was held at Albnquerqne, New Mexico, Wednesday, at which strong silver resolutions were passed. Afterward, it was resolved into a statehood convention, and steps looking to the admission of New Mexico as a State were taken.

We find in a Shasta county paper reference to a new process for working silver ores at Sonth Fork. It is a "pattern furnace, which chloridizes the ore with less wood and in shorter time than the old process." The somewhat sangnine statement is made that it will work "95 per cent of the base ore."

A. P. Forbes of this city has gone to Groveland, Tuolumne connty, where he will assnme the superintendency of the new Talc mine. The shaft is now down seventy feet, and it is proposed to continne active development. The rock assays from $18 to $20 per ton. It is thought to be an excellent property.

The mining interests of this county are looking better every week, says the Calaveras *Citizen*, and every section of the connty has some mining men puttiug things in readiness for the development of good leads of quartz. Our mines are all gold mines, and, as there is no discount on gold, they are eagerly sought for.

An exhibition of mining and metallnrgical appliances is to be held at Santiago in Chili next year, beginning on March 15th. The exhibition is under the charge of tbe Sociedad de Fomento Fabril, and any information in relation to it can be obtained from Señor Jnlio Perez Canto, secretary of the society at Santiago.

F. J. Zeehandelaar, a well-known newspaper man, formerly of this city and for fonr years past a resident of Spokane, where he has for a good part of the time been publishing the Spokane

Mining Record, is in San Francisco. He says it is extremely dull all through the Northwest now, with no indications of early improvement.

A CASE involving title to school lands worth $1,000,000, situated less than two miles from the business center of Tacoma, Wash., is to be heard before Secretary Hoke Smith, September 26th. John G. McBride, a merchant, claimed to have discovered gold, and filed his claims. The case now to be heard is the State's appeal from the Land Office Commissioner's decision in favor of McBride.

AMONG passengers for New York on the new steamship Lucania, which arrived recently, was Mr. Thomas G. Clayton of Derby, superintendent of construction of the Midland railway of England. He comes as the guest of his brother, Mr. James Clayton, president of the Clayton Air Compressor Works, New York, and while here will visit the World's Fair and make a study of the railway systems of this country.

THE quartz-mill owned by the Princess Mining Company at Alamo, San Diego county, was burned by incendiaries Sept. 14th, probably by Mexican miners with a grudge against the management of the company. The mill contained two Huntington quartz-mills, concentrators, crushers, etc., and a valuable engine and boiler. The mill and machinery are a total loss, amounting to about $12,000.

THE official statistics of the production of gold in Russia in 1892 show that the output of the mines has been greatly increased by the improvement of technical appliances. The production of the precious metal has reached a total of no less than 2601 puds, as compared with 2382 puds in 1891, and only 2041 puds in 1885. Taking the value of the pud on the average at 14,104 roubles, there is thus a total of 36,670,000 roubles or about $25,000,000.

THE Eclipse mine, situated in Requa gulch, Cripple Creek, Colo., has been sold by the numerous owners to R. W. Woodbury of Denver for $60,000. This mine became famous in the history of the camp as a producer of cubes of gold, something exceedingly rare. Many of these cubes exceeded one-eighth of an inch across the face and were found in both quartz and white talc. The mine has produced $12,000 or $15,000 worth of high-grade ore.

A GREAT DIAMOND was recently found in the African fields and is now in the hands of a cutter. It has been named the "Excelsior." It is in such good shape that it is believed it will weigh 500 carats when cut, which is several times larger than any other stone. There appears, however, to be a little black speck near the center, which may make it necessary to cut the diamond in two. Even then the two stones would be larger than any others, and of perfect color. The Imperial, the next largest white diamond, sold for $1,000,000. It is said that the owners want $1,250,000 for the Excelsior.

HARVEY P. JONES of Denver, Col., has patented a drill adapted to be operated by hand or power, which may be held at any desired angle, and has an automatic feed. The drill-holding frame is supported by a strap from the body of the workman, who turns an operating crank by hand, pulling back a hammer against the tension of springs, the hammer upon its release striking upon the shank of the drill. The rebound of the drill is taken up by a special mechanism, which is such that by a moderate turning of the crank a rapid succession of powerful blows will be struck and the drill will be held up to its work all the time. The principle of Mr. Jones' drill is not new, but it may be novel in some of its minor features.

Use of Explosives in Australia.

[Extract from report for 1892 by H. B. Nicholas, Senior Inspector of Mines for Central and Melbourne Districts to Minister of Mines for Victoria, Australia.]

Information about explosives, collected at the instance of the department, shows the high estimation which miners have of the nitro-glycerine compound—gelatine—and that there is unanimity of opinion thereon. The use of more powerful detonators is increasing, but not so quickly as their economic value would lead us to expect. The rapid and complete combustion of the explosive, through the use of the strongest detonators, assures the greatest effect of the charge and the minimum vitiation of the air. These are properties which every manager and miner should appreciate at once and should make every effort to secure. At the close of the year my attention was drawn to a handbill of an explosive manufacturing company, headed "Directions for the Use of Lithofracteur and Dynamite." The first was to the effect, "if hardened, as is frequently the case in cold weather, the cartridges may be softened by being kept in the workmen's pockets." Many years ago this course was suggested by the German manufacturers, but it is difficult to realize that such directions could be issued in Australia to-day. My correspondent remarked: "It makes me shudder to think of what will happen to some poor fellow who is a smoker and carries out this direction. It should be withdrawn." Of course the withdrawal of this direction is a matter for the consideration of the interested company, but I strongly condemn its further publication.

Safety Appliances.—There is no record of accidents to miners through cage mishaps. I have occasionally received notices of overwinding by engine-drivers, with statements that they were attended by loss of time only through stoppage of winding, or by slight damage to property by the detaching of the rope at the pit-head. The use of safety hooks, that disconnect the rope and suspend the cage, is almost universal. During the year I have made numerous satisfactory tests of the safety appliances of cages, and also have received reports of tests from the mining managers of all the mines of my district.

Gold in Ocean Water.

Extract from paper read by T. A. Rickard, of Denver, Colo., before International Engineering Congress, Chicago, August, 1893.]

The waters of the ocean contain gold. In 1851, Malaguti and Durocher determined the occurrence of silver, but did not extend their inquiries into the question of the presence of gold in sea-water. This fact was first accurately determined by Sonstadt in 1872. His experiments were not quantitative, but he stated, in parenthesis, that the amount was "certainly less than one grain in the ton." More recently, however, Münster found an average of five milligrammes per ton. In endeavoring to arrive at an approximate estimate, it must be remembered that local conditions, such as the temperature of the water, will affect the amount in solution. Sonstadt's researches were made with water obtained near Ramsey, in the Isle of Man, while Münster got his from the Kristiania Fjord. In each case the sea-water was that of a northern latitude. In warmer regions it is probable that precipitation, due to the presence of putrescent organic matter, may diminish the amount of gold held in solution. Let us, however, take five milligrammes (equivalent to one-thirteenth of a grain) as an approximation. This, though in itself a minute quantity, will be found to represent an enormous total amount of gold in the waters of the ocean. From the results obtained from the careful soundings carried out by the Challenger and similar scientific expeditions, it has been computed that the ocean has an average depth of 2500 fathoms, and that it contains four hundred million cubic miles of water. This is equivalent to about 1,837,030,272,000 million tons, which, upon the basis of five milligrammes per ton, would represent 10,250 million tons of gold. By way of contrast, it may be added that, according to Soetbeer, Leech and others, the gold production of the world, from the beginning of 1493 to the end of 1892—a period of exactly four centuries—has amounted to only 5020 tons. The present output is equal to about 200 tons per annum.

The gold in sea-water is kept in solution as an iodide. The amount of free iodine present in the ocean is very minute, but a large proportion of that element occurs combined as an iodate of calcium. From the results of a series of six experiments, Sonstadt found that a cubic mile of sea-water contains about 17,000 tons of iodate of calcium, or 11,072 tons of iodine. This represents the occurrence in the entire ocean of no less than 4,428,800 million tons of iodine.

The iodine which maintains the gold in solution is obtained from the iodate of calcium. Gold is soluble in extremely dilute solutions of iodine, which, under ordinary conditions, are in turn readily reduced by organic matter. That the gold in the sea is not precipitated is due to the presence of the iodate of calcium in which it is not soluble, but which, being readily decomposed by *putrescible* organic matter, liberates the iodine required to keep the gold in solution.

There is reason to believe that the sea-waters of to-day contain much less iodine than those of former geological periods. That there is so little free iodine in the ocean is due to causes parallel to those which bring about the noteworthy absence of carbonate of lime. Marine animals abstract the latter while marine plants absorb the former. How great is the work done in this way is evidenced by the dimensions of the coral reefs and by the extent of the foraminiferous and other marine limestones.

The abstraction of iodine is no less striking. Seaweeds, and more particularly those which grow at great depths, are the chief source of the iodine of commerce. When, after a storm, such seaweeds are cast upon the shores of Great Britain, France and Sweden, they are collected and burned, and from their fused ashes, termed "kelp," the iodine is subsequently extracted by a simple chemical process. From 13,000 kilos of kelp, about 100 kilos of sodium carbonate and 15 kilos of iodine are obtained.

That iodine is not now so plentiful in the sea as during former geological periods has been suggested by chemical investigations into the composition of rocks. Certain sedimentary formations contain notable quantities of it. It has been found in some aluminous shales in Sweden and also in certain varieties of coal and turf. The saline waters of several springs contain large amounts of it. Even rain-water has been known to give a recognizable iodine reaction when tested, such iodine having been obtained by the agency of winds which have been blowing over certain areas of the sea where it was being liberated by the action of organic matter upon the iodate of calcium.

TUOLUMNE is in line with the general activity and progress of the gold-bearing counties of California. The *Independent* declares that a number of old mines in the Summersville and Cherokee districts will be reopened shortly and that several mines have already started with good prospects. Other parts of the county expect to share in the prosperity of a general revival of gold mining.

Classification Should Precede Concentration.

[Extract from report for 1892 of J. C. Newberry, Mining Engineer, to Minister of Mines for Victoria, Australia.]

Wet concentration processes have attracted much attention of late, but, owing to various causes, no modern plants based on scientific principles such as are now generally adopted in Europe have been erected, and, as a fact, in many parts of the colony there has been a retrograde movement, and payable material has gone to waste. The most efficient concentrating plant is at the South German mine, Maldon, where there is some attempt to classify the crushed stone and then concentrate the sands and slime on Triumph vanners; but even at these works, Chinamen treat the tailings after they leave the vanners. At Daylesford, the Frue vanners are working better than on any other field, but here both Chinese and Europeans work the tailings, and after they have done their best the tailings still assay 2 dwt. per ton, and give a vanner concentrate assaying 6 oz. per ton. At other places the vanners do very little good. The true cause of the failure is not the fault of the machine, but is that they do not get fair play, being, as a rule, overloaded with both sand and water, and they are made to deal with coarse and fine materials of various specific gravities at one and the same time. It cannot be too often repeated that classification must precede concentration.

Vanner Test.—After my recent visit to Europe, the Luhrig Ore Dressing Company gave me one of the single vanners used in their system of ore dressing. I erected it at the Australian Electric Light Co.'s works, at Richmond. So far as Victorian auriferous tailings are concerned, we have demonstrated that the bulk of the tailings of nearly every district in the colony may be profitably re-worked. Bulk samples have been treated from Ballarat, Bendigo, Costerfield, Chiltern, Maldon, Daylesford, Rushworth, Walhalla, and other places. Before treatment on the vanner, the tailings were classified and, without one exception, no payable gold (i. e., about half a penny-weight per ton) was found in the sand, which remained on a brass gauge sieve of 50 holes to linear inch, and this coarse sand as a rule, amounts to about 50 per cent of the whole. So that, practically, this separation of fine from coarse grains reduces the bulk to be treated by half, and the half to be treated has nearly double the value of the original sand. Its subsequent treatment on vanners becomes a simple, inexpensive process.

Walhalla Tailings.—The exception just mentioned was in the case of the tailings from the Long Tunnel Company, Walhalla. Two series of trials were made with carefully collected bulk samples. The first sample was collected under the manager's direction, and the second actually by himself, as he doubted the loss reported in the first instance. The sand as received assayed 12 dwt. of gold per ton; on classification about half the gold remained with the coarse sand on a 50-mesh sieve, and a microscopic examination showed that the gold was in or attached to the quartz grains, and that no concentration without recrushing could save it. The fine material concentrated easily with but little loss—the concentrate assayed equal to 26 ounces of fine gold per ton. To prevent the loss of gold in the coarser sand a finer grating must be used on the battery boxes; or what, in my opinion, would give better results would be to continue the coarse crushing, classify the sands, recrush the coarser grained in some grinding mill, amalgamate with mercury (for the gold is nearly all free from pyrites), and pass the overflow from the amalgamators to the classifiers and vanners, where it will be concentrated with that which was crushed fine in the battery. Mr. Ramsay Thomson's sample may from some cause have been abnormally rich, but if it is a fair average it shows an almost incredible loss. The capacity of the battery is, I am told, about 100 tons per day: this, at 12 dwt., is 60 ounces per day, or £72,000 for the working days of the year. The lowest Walhalla assay I have made during the year gave 6 dwt. per ton, but the sand contained very little fine grains or slime.

ARTHUR L. PEARSE, a London mining engineer, who has just arrived in San Francisco from South America, declares that not more than four mines are being worked in all the richly metalliferous mountain districts of Peru, and those which are in operation are on the verge of closing down because of the little money to be made. Cessation of operations because of lack of profit would appear to be sufficient to dispel the glamor of romance which has always surrounded the Peruvian mines. As a matter of fact, the cost of silver production in these southern countries is considerably more than it is in the United States. All the machinery necessary to the equipment and working of the mines has to be transported at great expense over rugged mountain trails. The ore has to be taken to distant railway stations, packed upon mules. Indian labor is cheap, but it is slower and less intelligent than white labor.

A Cabinet Officer as a Smatterer in Mining Law.

TO THE EDITOR:—In the PRESS of January 14th last, there appeared an article headed "One Location to One Discovery," in which it was stated that Secretary of the Interior John W. Noble had cancelled the patent of J. F. Bigelow to two mining claims in the Marysville district, on the ground of only one discovery having been made, and even of that the existence had not been alleged in the location notices. As fraud has heretofore been the sole offence visited with patent cancellation, I felt desirous, on public grounds, of seeing copies of the notices in question, but on making an effort in that direction all I could learn was that the business was controlled by a Washington law firm, who hoped to secure a reversal of the decision. Not caring to address these lawyers, I acquired no further information on the subject than that which the article alluded to supplied. Of course if Mr. Bigelow's grantors had not found a mineral lode, cancellation of the patents was entirely proper, but that is not at all a likely supposition. If I had been enabled to look into the merits or demerits of the case before printing this article, it might have been of more service for the future guidance of prospectors than it can be now, but there are other matters in Mr. Noble's decision which call for criticism, and hence I send it to you.

The Secretary's main objection to the Bigelow claims seemed to be based on the fact that they were end-to-end locations, and in declaring them invalid he says nothing whatever as to his having proof that the vein claimed for 3000 feet did not, within that distance, "crop out" at any other than the locating point. If either locator had found the vein elsewhere within the lines than at the initial monuments, the decision, even from his own standpoint, was unjust and unworthy of a man professing to have a judicial mind. Ever since the Congressional mining law of 1866 was passed, the Government has been issuing patents to mining claims located in the way which is now condemned as fraudulent. Even for three and three-quarter years Mr. Noble, as Secretary of the Interior, went on contentedly granting patent after patent to mining claims initiated in the very way adopted by Mr. Bigelow's grantors. Either he neglected to do his duty during these years or later he was actuated by unworthy motives. It was the queer fact that he had suddenly become a strict expounder of mining, just as his official reign was about to end, which made me curious to ascertain what his real motives could be. His aim was not to interpret an existing mining law, but to enact, without the aid of Congress, a measure to suit himself. "No man being rational," says the Secretary, "would discover a vein or lode and so describe the location as to make one of the end lines run through the center of the discovery shaft, thus leaving territory not located in which it was demonstrated that ore existed and which might have been included in the description."

From this quotation it will be seen that the writer of it did not consider a prospector competent to establish his end lines satisfactorily, but he, sitting in Washington, was fully capable of instructing him on that point. While I believe that an explorer would in most cases show true wisdom in refraining from locating two claims at a given point on a lode, the law does not forbid the practice. It says: "No location of a mining claim shall be made until the discovery of the vein or lode within the limits of the claim located." There is nothing here requiring the mineral discovery to be 700 feet from one end of the location, or 700 inches, or even seven inches. If the discovery is inside of the "limits of the claim" by one foot the law is fully complied with.

If two miners met at a mineral outcrop six feet in length, and made the conterminous end-lines of two locations to cross it, so that each should have three feet, the claims could not, under the Noble decision, be declared invalid without proof being offered that at no other point within the 3000 feet appropriated had the vein been found. Mr. Noble offers no such proof in Mr. Bigelow's case. He interprets the law in a way the law does not interpret itself. He assumes, without any reason, that a locator's initial monument is always placed where his discovery has been made. "A discovery is a whole," says he, "and may not be divided and parceled out among several discoverers." That is true, but the real point is the extent of the "whole." If a prospector finds a small cropping of promising ore, he does not know whether he has got something of real value or nothing at all until he has devoted hours, and even days, in examining the ground which it seems to traverse. The "discovery" he has made is a very small part of the "whole" which he hopes to secure. Is there vacant space for a 1500-foot location? Is there a vein or has he only found what some miners call "a blow-out," that may be exhausted in a few hours? What signs of a lode or "wall rocks" does he see? If there are evidences of a ledge, recognizable by the experienced locator but telling nothing to the "tenderfoot," is it likely to pass into another kind of formation? These questions have all to be answered in the skilled prospector's satisfaction before he decides to make a location. To him a "discovery" is a "whole" 1500-foot claim of the mineral domain, which he has secured free from all dispute. If he is ambitious to do his best in his chosen line of occupation (which is the duty of every man), he will not rest contented with the little bunch of ore, or it may be only "indications" that might lead to ore, which first attracted his attention. He will keep breaking rock and digging holes until he has made several exposures of vein matter, which of themselves would meet the requirements of the law as to a "discovery."

These are important matters about which Mr. Harrison's Secretary of the Interior did not know anything at all. To him a little deposit of ore, not worth perhaps a ten-cent piece to anybody, is the harbinger, the "discovery," the "whole" of a great coming mine, likely to be worth millions of dollars, and he as protector of the Government's rights must see that its mineral treasures are not seized by unscrupulous men. What twaddle ignorance makes men, who think themselves wise, guilty of uttering, especially when for a brief time they get out of obscurity into the light of civilized day! Mr. Noble evidently considered good soil and good mineral lodes two kinds of Government property, alike easily exhausted by locators. But land, though abandoned by a shiftless occupier, is still of value, or will be some day. As to the thousands of "discoveries," holes and "wholes" which an old-time prospector has made, or tried to make, who was the chief loser when he abandoned them forever because of their worthlessness? Not the Government certainly, for it still owns them, but the pioneer himself, who sought a great deal more than he found.

Even a capitalist may pay the Government $5 an acre for a lode which will never be productive. If he had spent much on it he might add to the outlay and give time a chance to play a part in its history.

Ninety-nine one-hundredths of the mining claims located are worthless until money has been expended on them, and many, too, are proved to be that when the expenditure has been made. Save them by all means, Mr. Secretary, for the Government, for it is the only power that can hold them and not be crushed.

Our mining law is liberal to the prospector. It avoids dictation and rewards him for the risks he takes by making it easy in most cases to acquire a perfect title.

The executive officers of the Government have usually made its generous, sagacious spirit their guiding standard. And it is no more than right that they should do this. If a prospector going out into a wilderness finds a mineral belt where he and others subsequently locate valuable mines, which in time keep thousands of men at work and put millions of dollars in commercial hands, his pioneering work makes him a public benefactor. If, without influence or money, he can by his energy, fearlessness and prospecting skill, make a valueless mountain the source of wealth to others, if not to himself, he has even then not lived wholly in vain.

The end lines of a mining claim are established at times by a practical system of reasoning on the part of a locator. He walks along the visible or partially blind outcrop, watching for mineral stains in the inclosing country rock. These stains tell him that there is ore in the near-by vein. When the stains cease he knows in a general way that he has come to the end of an ore-chute, and as he does not want any of the outlying territory, he gives it to some neighbor, who, perhaps, cannot on his own account find anything of value, for a week's work to be done at the end of the claim he has just staked out.

If the vein exposed by such work looks better than was expected, both men may, for economy's sake, keep working along there. Each of these locators, I will assume, has found the lode at several spots within his lines. After some years a capitalist buys, in good faith, both locations, but suddenly finds that the patents issued to him have been canceled because his grantors were declared by the Secretary of the Interior to be irrational beings, in that they had made locations in the very way that hundreds of patented mines had been located in the long ago.

I do not know whether this hypothetical case resembles that of Mr. Bigelow in any respect, but I do assert that a Secretary of the Interior who deemed it his duty to cancel patents to lodes located in the way described would thereby show his unfitness to hold the office bestowed upon him.

There are cases where two full locations ought invariably to be made end to end. I have a deep, narrow canyon in view, where the apexes of several very valuable veins are visible only for a few feet as they cross its bed. For miles on the one side and a long distance on the other, the ore-bearing formation is deeply covered by volcanic rock. Under Mr. Noble's dictum only one location could be made on each of these lodes. But here is an opportunity for the Government, the miner and the country at large to win 3000 feet on each of such lodes, in place of 1500 feet. Now in part of the concealed veins could ever be found by surface work, and save for one thing their treasures might be undiscovered and worthless for hundreds of years. That one thing is this: If the owners of one location on each ledge found the property good, they would in time run drifts to the vacant ground and locate two more claims on each lode. They would thus through the mining ignorance of a forgotten Secretary of the Interior secure a monopoly of 4500 feet on each. A result like that would be a pat exemplification of Mr. Noble's theory that a "discovery" is a "whole," and must not be divided.

Then, again, lodes often crop out on a mountain summit without being visible on either side. A prospector living to the south of the range would not want anything on its north side. If he located one way, and a man living on the northern slope claimed the other end, some future Mr. Bigelow would suffer, because a Secretary of the Interior of the Noble caliber did not know enough to discharge the duties devolving upon him in an equitable way. Our present Secretary of the Interior ought to abrogate Mr. Noble's decisions, for the following reasons:

First—It is not a ruling on an existing mining law, but an attempt to enact a new measure.

Second—It dictates to the prospector as to the locating of mineral ground, when the law itself avoids dictation.

Third—By inference, it requires the initial and discovery monument to be about half way between the two ends of a claim, when the law leaves that matter entirely to the judgment of the locator.

Fourth—It, in effect, decides that a mining location cannot be legally made from one end, while the General Land Office is every day issuing patents to mining claims located in that way.

Fifth—It prevents the locating of two claims end to end, when it would be of advantage to the Government, to the miner, and to the country generally that, in certain cases, such locations should be made, and

Sixth—The decision is whimsical, weak, and unworthy of the Government's liberality to prospecting miners.

As long as the decision in question remains unreversed, it will be well, in locating a lode, to have the mineral discovery well inside the claim lengthwise. In Arizona, a printed form of notice is very generally used. It invariably makes an end-center monument the initial point, and it never indicates the relative position of the mineral discovery. A cancellation of patents to lodes so located may some day convince claimants that greater definiteness would be an advantage. To make the Noble decision harmless, the initial monument of a claim should be placed beside the mineral discovery. The difference between a good and a bad mining title depends, at times, on very small matters being attended to in preparing a location notice. Exactness is essential. It will be wise also for those who wish to patent two end-to-end locations, to send in but one at a time to the Land Office. If Mr. Noble had seen only one patent it would not have been cancelled, but two patents on one lode, to one applicant, at one time, completely upset him.

A haphazard decision of the kind criticized proves conclusively that our mining law, good though it be in its main requirements, ought to be amended. Its language in some places is so indefinite that several opinions as to its actual meaning might be given—nearly all alike reasonable. The great obstacle to a sensible revision of its defects is found in the person of Senator Wm. M. Stewart. He seems to believe that he, and he alone, can satisfactorily revise the law, and the comical part of his performance in that line is seen in the fact that he plainly does not understand the law which he seeks to amend. He will probably soon introduce a new mining bill in Congress, filled with the old blundering rigmarole of his previous productions, and if any other bill were brought forward, he would fight it as an intruder upon his domain. If the ex-Secretary of the Interior and the Nevada Senator were valued by the mining community according to their own estimates of themselves, they would be universally regarded as a pair of great mining lawyers. JOHN DARE EMERSLEY.

Dos Cabezos, Cochise Co., Ariz., Sept. 7th.

THE Amador *Record* declares that a new era is dawning in that county, and that there is more activity in gold-mining than for some years. Several old properties that have been shut down for some time, like the Bunker Hill, Quartz Mountain, Belmont and others, are being reopened under most favorable auspices. Home people, too, are getting interested, and prospectors are out in numbers hunting for indications and looking for new ledges. The *Record* calls attention to the tendency to develop ledges along the Mother lode only, and declares that there are numerous other gold-bearing veins and gravel deposits which have heretofore remained untouched and almost unnoticed.

Mechanical Concentration of Ores.

By J. J. East, Fellow of the Geographical Society, in *Australian Mining Standard.*]

By regulating the force of a stream of water which rolls the solid particles along over the hed is due the successful operation of various devices known as tyes, huddles, vanners, and variously named tables. The action of the current may he assisted by giving the current a side push or thump to create further disturbances among the particles, and so assist the scouring or rolling action set up hy the current. No particle is of defined geometrical shape, but only an approximation to such; and in the case of splinters or ohlong fragments lying with their narrowest parts against the stream, they must be dislodged from the position assumed before they can be carried farther down. The thump given the hed on which they rest not only dislodges them, hut throws them somewhat nearer one side or the other of the channel, and so prolongs their journey's length. The particles lying heaviest on the bed will be thrown farthest and out of touch with those lighter particles which may have lodged in front of them, and in this manner the scouring current makes a fresh sweep of the place they had blocked.

The German grave buddle or Cornish tye operates after the manner of the sedimentation of a river channel. The water is led in a current ten inches wide and half an inch deep, and throughout its whole length the ore, which is fed in at the upper end, is evenly distributed with the heaviest particles nearest the head. By stopping the open lower end with a piece of stick laid across it the current is restored to its original depth, and a new stratum of ore prepared, and so on till the tye is filled, when it is emptied with shovels. The middle portion is put through another tye, and the tail end thrown away. The huddle proper is a low cone, giving on every side an inclined plane over which a thin stream of water runs, and forces along any particle which is not so large as to produce a friction on its hase in excess of the current force. It is, therefore, a classifier, in some respects similar to the tye; so, too, is the Frue vanner or endless belt, presenting a continuous inclined plane to the current. The Spitzkasten is a current separator in which the current enters a hox as wide again, and the current speed is diminished. All particles which do not hottom in this current before it flows over the dividing partition are carried into another hox of increased width and still slower current. In this way a succession of hoxes obtain different classes of equivalent falling particles. The Spitzlutten is an arrangement of hoxes in which an extra current coming in from below each hox prevents anything settling which is not able to force its way against the current.

Jigging is the suspension of the particles in a frame with a wire meshed or perforated plate hottom, and a pulsating action given to the mass hy movement of the frame up and down or by movement of the water. On the theory of falling hodies through water the Germans have elahorated a very refined system based on classifying the various particles in lots of uniform size. The Collom jigs are the latest development of this principle. The water is hrought up against the sieve with force just sufficient to lift the mass, which then in settling down causes numerous ascending currents to pass up through the bed, but becoming split and lessened in force with each particle encountered, until finally only the smallest grain can be removed, and this remains uppermost, the largest particles being below, the small heavy ones having passed down through. The jigging of the old style necessitated stopping the sieve at this stage and skimming of the light waste, then resuming with a fresh charge as hefore. The present style consists in having a current of water flowing continuously over the charge while it is pulsating and carrying the waste material away as tailings. The small ore particles which fall into the hutch heneath are drawn off at intervals as necessary. It is at once seen that this continuous jigger is equivalent to a pulsating action given to the tye, and it is really a matter of surprise that the parallel should not have heen followed further hy having long sieves. This is the distinctive feature most apparent in the jiggers used hy the Cornish miners in South Australia, and which work so splendidly on copper ores in the Moonta and Wallaroo districts. There is, however, another feature which involves a principle hitherto disregarded hy German jiggers. Motion is given to the water by the down stroke of a piston in a side chamher of the machine. To prevent a back suction on the up stroke various devices of valves or traps have heen used, all based on the principle of the Spitzlutten or the descent of particles against an ascending current. In consequence very close sizing is necessary or failure will result, the failure heing principally caused by inability to do anything further with the "middlings" grade of concentrates. This is said to he the cause of some well-known Australian failures. With the Cornish, or it might more fittingly he termed the "Moonta" type of jig, back draught is not only allowed hut actually sought. The explanation is this: Particles passing down through the spaces between larger stones are in reality sinking through a tube. Experiments with tuhes show that if the particle is over four-tenths of the tuhe's diameter, friction hecomes very perceptihle and increases rapidly with any further increase in the size of the particle. When, therefore, hack suction is permitted, the opened hed of stuff is immediately compacted, the larger stones feel the draught first, and, immediately settling down, force up ascending currents from between them until finally brought to rest by squeezing some smaller particle whose weight has hrought it down to that level. The stroke is nearly over by this, and the finish of the current carries small ore down into the hutch, out of the way of the next ascending current of up-stroke. The lahorer in attendance, in case the suction is too strong, simply throws in a few extra shovels of ragging or coarse stuff, or, if too weak, takes a few shovelsful out, and so the work proceeds continuously.

The Moonta "long jigs" are of two types. One, "Hancock's Patent," causes the whole sieve and its hurden to lift, and so produces suction; the other, "Warren and May's Patent," is a piston jig, and the suction is ohtained by dispensing with valves or traps, a modification made by Captain Cowling of the Hamley mine. As to the relative merits of the two types, there is much to he said for hoth. Splendid work has heen and is still heing done by each. Hancock's jig has not been worked elsewhere, but certain modifications of Warren and May's, known as Edwards' concentrator, made by Hawke & Co., at Kapunda, answered splendidly for antimony ores in Queensland, and for tin in the Northern Territory. Hancock's and Warren and May's, at Moonta and the Hamley mines respectively, treat or have treated ahout 1000 tons of ore per week with a loss of only one per cent of ore in the tailings. May Bros. have now a plant at the Silver Queen, in Tasmania, which is hringing to that mine £200 a week profit; and it is well known that Hancock's machine has been able to successfully deal with a parcel of 20 tons of ore forwarded to Moonta hy the Broken Hill Junction Company. The tailings produced contained only one per cent of lead, and the zinc blende was hrought to within three per cent of a separately marketable article. One feature of Hancock's jig is an extra motion given to the jig longitudinally, whereby the stuff is caused to travel the whole length of the sieve even if necessary against the horizontal current of water. Therefore a continuous current of water is not required for moving the tailings along; and heyond the mechanical loss of water absorbed hy the stuff treated, say 20 per cent, the water question is not a very important one. May Bros.' and Hawke's machines use the current and pump the water over again and so maintain their current action. It is apparent that though the machines work on easily understood principles, some intelligence must he exercised in classifying the stuff sent to them and also to the length of the jig corresponding to the amount of stuff to be treated. With almost clean sulphide ores, such as those of the Barrier, it is easy to ohtain very rich "heads," but the "middlings" and "tailings" are practically hut little affected. The Moonta tests seem to show that the shortness of the jigs used at Broken Hill has much to do with this failure. It is, perhaps, not too much to hope that to South Australians must yet he given the credit of showing one way out of the sulphide problem, now so pressing.

The difficulty of ohtaining water at all times has caused recourse to machines which utilize the air instead. Here again the methods may he divided into two hroad classes—hed friction and free falling. The Tierra Seca is an application of the Spitzlutten principle. The stuff passing over a shaking layer of shot, up through which a current of air of measured strength is forced, all heavy particles sink among the rolling shots and work through the wire mesh below. Very successful work was done with a working model at the Adelaide School of Mines. The machine was worked by John Lawson, and the sulphide ore came from the British Broken Hill mine. The Clarkson-Stanfield machine resembles the centrifugal broadcast seed-sower of the agriculturist. In effect it is a circular Spitzkasten, the heavier particles heing thrown farthest outward and sinking as they travel. Partitions can he erected to intercept as desired. Phillips' dry blower, now heing introdnced at Wadnaminga, is in effect a Frue vanner, on whose surface jets of air will operate in place of water.

The rules for calculating falling rates and frictional resistance are the same for machines using air as well as for those using water. Water heing incompressible, any force applied to it can he transmitted without loss; hut air heing compressible, current separation can only he done provided the current is not checked by blocking. If the current he checked at all through hlocking, the air becomes compressed until sufficient pressure is developed to clear the way, which then causes a reflow of current far in excess of requirements. This is one of the practical difficulties in using air. The Clarkson-Stanfield throws the particles through unconfined air, and so preserves a constant friction, varying only with the size and velocity of the particles.

[A coarse canvas belt will save much more of the fine gold than the rubher helt. A canvas belt was used very successfully by one of our old correspondents in 1847. It was called the "Brunton Dressing Frame."

A percussion movement is much hetter than the side or end shake now used by the different vanners. A simple test to show the difference can easily he made with one of Attwood's wooden bateas. After the rotary motion with percussion has heen used, so that the heavy bodies have settled in the center of the batea, raise one side of the hatea and try first a shaking motion. Then with the palm of the hand continue to strike the raised side of the hatea, and the great difference between the two movements will he seen.—Editor.]

The Origin of Gold.

The subject of the origin of gold, or of the manner in which the metal has reached its present positions, is one which has at all times excited considerahle attention, and the number of theories put forward has heen almost as great as the number of writers on the subject, writes Philip Lake, of Cambridge, England, in *Science.*

It is easy to understand the presence of gold in alluvial deposits, for this has clearly heen derived from pre-existing rocks; but the difficulty lies in determining how the auriferous quartz-reefs and other rocks which we look upon as the home of the gold, became impregnated.

Sir Roderick Murchison, from his observations in the Ural mountains, originally held that non-alluvial gold was only found in Paleozoic rocks, and principally in his Lower Silurian, but he believed that it was not introduced into these rocks until shortly hefore the Drift period. Suhsequently he was led to modify these views to a certain extent, and to admit that Secondary and Tertiary strata when penetrated by igneous rocks or impregnated by mineral veins, might also contain gold.

More recent ohservations show that gold may be found in rocks of any age in metamorphic strata; but all the evidence seems to support Murchison's next contention, viz., that gold is of igneous origin.

There is prohably no more instructive area to illustrate this than southern India, where the distribution of gold has been carefully worked out hy Mr. R. B. Foote, of the Geological Society of India. Almost the whole of this part of India is made of crystalline and metamorphic rocks; and in it there are a large number of gold mines, more or less rich. A closer examination of the country shows that we have here a large mass of gneissic and granitoid rock which is crossed by a number of bands of schist, lava flows, hæmatite beds and conglomerates. Mr. Foote has shown that these hands helong to a system which is distinct from, and newer than, the gneiss, and to this system he has given the name of Dharwar. He has also shown that all the gold fields of southern India, with the possible exception of the Wynaad, lie within these Dharwar hands.

As usual, the gold is found principally in quartz-reefs; and it is a remarkable fact that though quartz-reefs are by no means uncommon in the gneiss, as well as in the Dharwar heds, yet those in the gneiss are never auriferous. It is clear, therefore, that the gold cannot have heen introduced into the reefs from helow, for in that case there would be no difference in that respect hetween the reefs in the gneiss and the reefs in the Dharwar.

Only one other possihle conclusion remains, viz., that the gold originally lay in the Dharwar rocks themselves, and that it has since, by some process of segregation, been gathered together in the quartz-reefs.

It has already heen stated that lava-flows occur among the Dharwar rocks; and my own ohservations have led me to believe that many of the schists also are lava-flows. In fact a very large part, if not the greater part of the system, appears to be of volcanic origin.

It may he concluded, therefore, that the gold which we now find in the auriferous reefs of southern India was derived from the rocks of the Dharwar system; and that it was originally brought up from the depths of the earth hy the lava-flows which form so large a part of that system.

THE Russian Government has ordered that its mints shall no longer receive from individuals silver bars or worn silver pieces to be converted into coin, and the importation of silver coin is prohibited. This prohibition, however, shall not apply to Chinese liang, which China may still send into Russia over the frontier. No great significance is attached to the order, as most of the money of Russia is paper and the silver coins are few.

THE Spanish mine in Nevada county which holds the record for cheap mining and milling of ores, has been sold, as will be seen by reference to our summary. The price is said to be $55,000.

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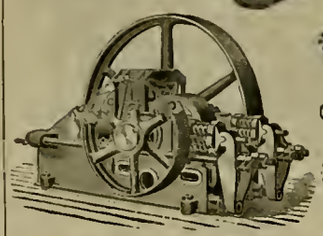

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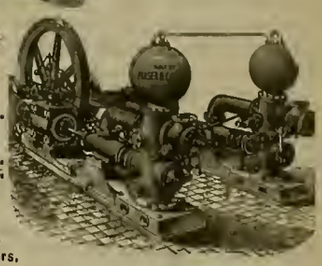

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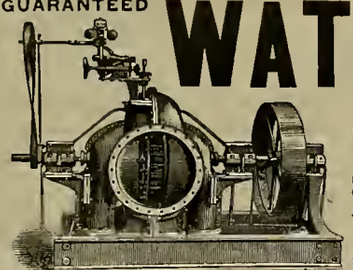

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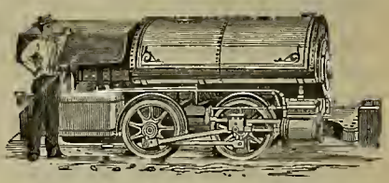

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The Ancient and the Modern Gun.

An engineer, after visiting the caravel "Santa Maria," remarked that the little guns of that vessel were silent witnesses as to the limited advance in the science of ordnance, bet bore potent testimony of the advance in the mechanic art. "Here" said the engineer, "is a built-up breech-loading gun; it has a central tube, on which jackets are shrunk (or forced) in short sections; at the joints between these sections there are other iron bands, tightly shrunk. The breech block, which is chambered, contains the cartridge; it is held in place by a key, or wedge. This gun is certified to be a *facsimile* of those actually used by Columbus on board the 'Santa Maria.'

"The difference between this gun and those now being built, and about which we read such interesting accounts, differ in magnitude, not in principle. The molecular strain in a forging or casting of great size led to the abandonment of cast guns and the adoption of built-up guns in our own generation; it seems evident that as the cupolas advanced in size and the molders' art progressed, the cast guns of large size became practicable; but with the increased internal pressures demanded the castings reached their limit, and built-up guns became essential.

"The gun of to-day is composed of a central tube, on which are shrunk 'hoops' in shorter sections; its breech block is held in place by a slotted screw, which is but another form of the wedge, being a circular inclined plane.

"The difference between the guns of Columbus' ships and those of to-day is due almost exclusively to the mechanic arts; to the steam engines as the power; the furnaces, the cupolas, the hammers and the lathes as the tools, and to the brawny sons of toil who work these machines; the advance has been gradual, and is wrought by machanics and draftsmen and the claim that gunnery or that ordnance belongs to the occult science pales before the scrutiny of common sense observation."—American Manufacturer.

The Battle Ship "Resolution."

The great Palmer Shipbuilding and Iron Company is about to complete for the British navy a vessel—the "Resolution"—which divides with the "Revenge" the honor of being the largest and heaviest vessel built on the Tyne. Some idea of her enormous size may be gained when it is said that her displacement exceeds that which was possessed by the ill-fated "Victoria" by about 3700 tons. Her dimensions are: Length between perpendiculars, 380 feet; breadth, 75 feet; mean draught of water, 27½ feet; displacement, 14,150 tons; freeboard forward, 19½ feet, and freeboard aft, 18 feet. The vessel, which is of steel throughout, is constructed on the longitudinal principle, and the hull is subdivided into 220 water-tight compartments.

The heavy artillery comprises four 67-ton breech-loading guns of 13.5-inch caliber, two being located in each barbette. These guns are capable of being trained through an arc subtending an angle of 120° on either side of the center line. The auxiliary armament includes ten 6-inch 100-pounder quick-firing guns, four of which are mounted in armored casemates on the main deck and six on the upper deck, protected by armored shields, sixteen 6-pounder quick-firing guns, nine 3-pounder quick-firers, two 9-pounder field guns, eight 5-barelled machine guns, and seven torpedo tubes, two of which are submerged.

The propelling machinery consists of two sets of triple-expansion engines, each having cylinders of 40-inch, 50-inch and 88-inch diameter respectively, with a stroke of 4¼ feet. Steam is supplied by eight single-ended boilers, each working at a pressure of 155 pounds per square inch. With forced draught, the engines are expected to develop 13,000 horse-power and drive the ship at 17.5 knots, while under natural draught the horse-power will be 9000 and the speed 16 knots. The auxillary machines required for steering, warping, distilling, etc., number 69.

Good Results in Castings.

The Midvale Steel Company of Philadelphia has recently turned out some remarkably large and heavy steel castings. Among these was a frame for a hydraulic riveter, which weighed 23,315 pounds. Each casting measured 26 feet 2 inches long by 73¾ inches wide at the widest part, and the pair weighed nearly 45,000 pounds. Test bars cut from the casting previous to annealing gave the following results: Tensile strength, 89,660 pounds per square inch; extension, 22.67 per cent; contraction, 41.07 per cent. Another large casting was a hydraulic cylinder, the weight of which was 16,594 pounds, and was without a blemish. A test bar cut from the casting before annealing gave the following results: Tensile strength, 92,050 pounds per square inch; extension, 21.20 per cent; contraction, 30.85 per cent.

Punching and Shearing Structural Steel.

Tests to determine the effect of punching and shearing structural steel serve to strengthen the evidence already existing, that up to thicknesses of, say, ½ in., these processes do no greater injury to steel than to wrought iron, says *Engineering News*. This is especially gratifying since the general belief has been until quite recently, and, indeed, is common even yet, that soft steel required to be reamed after punching, or preferably drilled, to develop the full value of its greater strength and ductility for structural purposes. The chief drawback to the more common use of the metal by engineers has been due to this probably more than to any other one thing. The advantage of being able to use the punch for ordinary qualities of structural steel hardly needs to be pointed out. The simplicity, rapidity and economy of the process are all in its favor. Conservative estimates give the relative costs of punching, reaming and drilling as 1, 1½ and 3, and with a given shop area and capital invested in appliance probably at least 10 per cent more material can be prepared by punching than by drilling. The results of the tests referred to would seem to show that the further tabooing of soft steel for this reason is inexcusable and can only be attributed to ultra conservatism and lack of progressiveness. Briefly stated, they show that steel not exceeding 80,000 lbs. tensile strength per sq. in., may be punched up to thicknesses of ½ in. without greater injury than wrought iron. Up to thicknesses of ⅜ in. no advantage seems to he gained by reaming the punched hole, indeed, the advantage seems to be on the side of the punched hole. Beyond this thickness, however, reaming is advantageous. In regard to drilling, the evidence presented is that no advantage is gained over reaming in thicknesses of less than ¾ in.

Hollow Shafts for Steamships.

A point not generally known in connection with the machinery of modern steamships is that all the shafting is hollow. After the shafts have been forged solid, a core, sometimes 6 or 8 inches in diameter, is bored out from the center, leaving a safe amount of metal in annular form for the work required. The reason for this is that a hollow shaft is really stronger as well as lighter than a solid one, and also that the core of a solid shaft often embodies impurities and incipient cracks which may radiate to the surface after long use and cause disaster. The same idea of hollowing out is carried through the entire system, even the crank pins being bored.

Scientific Progress.

Aluminum from Clays.

Lately schemes for cheaply extracting the aluminum from common clay have been worked with great profit. Numbers of these schemes have been brought to the attention of the State Mining Bureau. This statement is from State Mineralogist Crawford's Bureau:

"There are apparently several parties in this State who are working the credulous for capital to extract aluminium from various qualities of clay. It has often been remarked that every clay bank is a mine of aluminium. While this statement is chemically true, it is not true from a metallurgical standpoint.

"The active agent in reducing aluminium to the metallic form is the element sodium—the metallic base of common salt. Sodium has an intense affinity for oxygen, so strong that it will abstract oxygen from its combination with aluminium (the sesqui-oxide of aluminium), and will also abstract oxygen from ordinary quartz—known to chemists as oxide of silicon—leaving the element silicon free. In every clay bank there is both silica and alumina—these representing the oxides of silicon and aluminium.

"Metallic sodium is the only agent that cannot be used in a comparatively economic manner to abstract this oxygen. Unfortunately for these pseudo-aluminium metallurgists, the silicon is also reduced to its elemental form at the same time that the aluminium is being reduced, and the two metals form an alloy which is brittle, and consequently unfit for the uses in which aluminium is applied in the arts.

"No process has yet been devised to free aluminium from this combination of silicon, and it is highly improbable from their similarity of chemical deportment that such a result can ever be achieved in an economical manner.

"It is for this reason that manufacturers of aluminium are obliged to depend for the success of their works upon the use of compounds of alumina which do not contain silica.

"The materials used are the mineral cryolite (a double fluoride of aluminium and sodium) and an artificially-prepared sesquioxide of alumina. These are suspended in a bath of molten chlorides of the alkaline earths and then subjected to electrolysis by powerful dynamos. The sodium salts are decomposed. The metallic sodium seizes eagerly upon the oxygen that was in combination with the aluminium, and as a result the white metal aluminium is freed and settles to the bottom."

Tornadoes.

In an address before the World's Congress of Meteorology, at Chicago, H. A. Hazen, of the U. S. Weather Bureau, said concerning tornadoes:

"Perhaps the most persistent phenomena in connection with tornadoes are the constant and profuse discharges of lightning which immediately precede or accompany them. Balls of fire or globular lightning have also been noted often. Tornadoes are very narrow, seldom over 500 feet, and always move from a westerly to an easterly point. There is a loud and indescribable roar which precedes them, and this may be heard 15 minutes before the tornado strikes, and will generally give sufficient warning. This roar is probably due to a constant thunder and has been heard in a modified way in connection with a severe thunderstorm. The paths are parallel, and distinct tornadoes move along these paths, beginning after the hottest part of the day. Each tornado has a path a little to the southeast of the former. This action may be kept up till after sunset or five or six hours after the hottest part of the day.

"Little careful attention has been paid to the observation repeatedly made that the first appearance is of two clouds, one coming from the northwest and the other from the southwest. This appearance has been greatly misinterpreted at times, as it has been thought that the north cloud, which is cold, has met the warm south cloud. This has given rise to enormous contrasts of temperature, and the terrible conflict between these has developed or resulted in the tornado. It is evident that the meeting of two clouds of different temperature could not produce an unstable equilibrium at all; moreover, the appearance of these clouds all along the line show that they are engaged in a continuous action and do not form a single union, and thereafter move on as a storm. The distribution of debris also shows this clearly. In the center of the track all material, trees, etc., are deposited in parallel lines and look as though propped by a mighty river flowing over the ground. On the south side there is an inclination inward and forward along the line of the storm. On the north side there is a similar action, but oftentimes the trees and debris are deposited in lines pointing to the direction from which the storm has come, showing that in such cases the north cloud acted first.

"The most interesting point which now has come to the front is regarding the occurrence of an enormous whirl, with a diameter equal to the width of the greatest destruction. It has been thought impossible to account for the terrible destruction on any other theory. It is conceded at once that the onward progress of the tornado at 40 or 50 miles per hour could not do serious damage, but if the cloud rotates at 300 or 400 miles per hour all the destruction could be easily explained. Unfortunately this supposition, when properly examined, shows its own weakness. If a funnel whirling at 300

miles per hour should move at the rate of 40 miles per hour, then on the north side the velocity toward the rear would be 260 miles an hour, and in front it would be 300 miles per hour. No such action as this has ever been noted. It is safe to say that there is no such uniformity in the destruction or disposition of debris. This point regarding the whirl of the tornado is the one over which there is the greatest controversy at the present day, and demands the most careful investigation, especially in the line of a study of the debris. The strongest proof of the whirl has been the appearance of the cloud in midair, but a little thought shows that this appearance is most illusory and cannot be accepted in the light of the almost universal records of the distribution of debris."

Scientific Facts.

A ton of sea-water is supposed to contain about 14 grains of gold.

Sixteen ounces of gold are sufficient to gild a wire that would encircle the earth.

Whenever there is friction there is heat. Hammering a nail rod until it is red-hot, or forging a nail without fire, are feats of the blacksmith.

During the last Paraguayan war it was noticed that the men who had been without salt for three months, and who had been wounded, however slight, died of their wounds because they would not heal.

A frog cannot breathe with its mouth open. Its breathing apparatus is so arranged that when its mouth is open its nostrils are closed. To suffocate a frog it is necessary only to prop its jaws so that they cannot shut.

Prof. Virchow reaffirms his belief that no trace of "the missing link" between man and the lower animals has been discovered, either in the human skulls which are believed to be most ancient, or in the physical structure of modern savages.

Among solids, glass is apparently perfectly elastic. A plate of glass bent under pressure and allowed to remain under stress for 25 years, when released and carefully tested for any permanent set, was found to have returned to exactly its original shape.

The Planet Neptune.

September 23d is the anniversary of the discovery of the planet Neptune. This was a great event in astronomical science. The invisibility of the planet to the naked eye renders it of little interest to most people, but to the astronomer the boundary planet of our system is an object of special wonder, says Prof. Orrin E. Harmon, in the Seattle *Post-Intelligencer*. The discovery of Neptune confirmed the Newtonian law of gravitation, and brought fame not only to Adams and Leverrier but to our American astronomers, Walker and Peirce. The researches of Walker developed the fact that the planet had been seen before by the French astronomer, Lelande, in 1795. Peirce believed that the discovery of the planet in 1846 was an accident rather than a result of the calculations of Adams and Leverrier, and his investigations of this theory attracted wide attention. Few names in the scientific history of America are more honored than that of Benjamin Peirce, yet the astronomical world has generally rejected his idea that the discovery of Neptune was accidental.

Reason in an Old Superstition.

The old-time superstitious beliefs that human beings should sleep with their heads toward the north is now believed to be based on a scientific principle. Some French savants have made experiments upon the body of a criminal who had suffered death, and these tests go to prove that each human body is in itself an electric battery, one electrode being represented by the head and the other by the feet.

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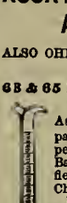

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Repairing Incandescent Lamps.

The manufacture of incandescent lamps has served as an example of the economies growing with the industries. An incandescent lamp past service was formerly deemed as useless, although not as noisome, as an egg retired from active business. The rising price of platinum rendered it worth while for lamp manufacturers to collect old lamps, and to separate and crush the necks, as preparatory to the separation of the platinum leading in wires by washing in a manner comparable to that in which the platinum was originally separated from the natural deposits.

The decision of one of the Federal Courts in the United States sustaining the Edison lamp patent also gave a value to destroyed lamps, as one always has the right to repair a patent article which has come into his ownership; and this repairing of Edison incandescent lamps has become quite an industry. Lamps with broken filaments are perforated by crushing the end of the protruding tip of the lamp, and then revolving it rapidly in a lathe while the end of the lamp is heated by a gas-blast flame until the glass is softened, and the centrifugal force assisted by a former inserted into the orifice, increasing the diameter of the hole from one-twentieth of an inch to about three-fourths of an inch. The remnants of the old carbon are cut away and the inside of the lamp carefully cleaned by special tools. A new carbon filament is attached by electroplating of copper at its terminals to tiny copper tubes, about one-sixteenth of an inch in diameter and three-eighths of an inch in length, which are inserted in the lamp, and the tubes placed upon the projecting copper and platinum which held the filament originally in the lamp. The contact is made secure by means of a pair of nippers which crush the tube with lateral corrugations. The end of the lamp is then softened by heat, and the opening reduced to about one-quarter inch, and sealed to a tube. The lamp is then evacuated and finished in the usual manner. When a lamp bulb has been broken, the glass is cut away at the neck, and a glass tube fused upon it, which is afterward blown, and the carbon filament inserted in the method described. It is estimated, says *Engineering*, that over 10,000 lamps per day are being thus repaired in the United States, consuming not only all the available breakages, but their demands are levying upon stray barrels and boxes of old lamps which have been broken in the past and not thrown away, but stored in sheds and attics in accordance with that prudent New England principle which checks the destruction of anything which may be considered to contain the possibility of possessing a value at some future time.

What is Electricity?

As far as the writer is able to understand the matter now, electricity is simply motion of the different substances which are the subjects of electrical action, just as heat, light and sound are, and the only difference between these forces is the rate of motion, says the *Electrical Review*.

The motion of sound, as we all know, is comparatively slow; that of heat and light very rapid. That electricity would appear to be somewhat between the slow motion of sound and the rapid motion of those heat waves whose motion is slowest.

And it would appear that the wonderful adaptability which electricity shows for every kind of work, is due entirely to the position which its rate of motion occupies in the scale of energies.

It would also appear that the reason this wonderful agent lay dormant for so many ages, and is even now only partially developed, is, very largely at any rate, because we have no sense which responds to the particular periods of vibration comprised within the electrical range.

Heat currents would be far more efficient than electric currents if we could make use of them as we do of the latter; and as before remarked, the reason electricity is such a useful agent appears to be because its rate of vibration is sufficiently high to admit of rapid transmission, yet not sufficiently so to be destructive. It only becomes destructive when it is transformed into heat.

Ocean Telephony.

Dr. Sylvanus P. Thompson, the noted English electrician, considers that telephoning across the ocean is one of the possibilities of the early future. In a paper on this subject before the International Electrical Congress he described a cable which, if used in trans-Atlantic work, would perform the same service now requiring eight cables. In the present cables the slowness with which the insulation around the copper wire changes from low to high and from high to low potential, limits the number of words that can be sent to about 25 a minute, as claimed by the Postal Cable Company. Were the cables made with two wires, one for the outgoing current and one for the returning current, with induction coils connecting the two so as to produce a slight leakage from the outgoing wire, these induction coils, placed uniformly ten miles apart, such a cable would transmit signals so much more rapidly that, in his judgment, ocean telephony would be possible, or, if not, then at least the Morse signals could be sent so much more rapidly that one cable would do what now requires eight.

An Electric Clock.

E. T. Evans, a jeweler of Golden, Col., after nine years hard work and constant study, has invented a clock which has electricity for its motive power. The clock in question has neither weight nor spring, but consists only of three wheels, a pendulum, and only enough power is required to overcome the lost motion of the pendulum. The two electro-magnets are arranged similar to a motor. In starting the pendulum connection is formed on one side, and at a certain angle is automatically cut off again, the pendulum swinging back of its own gravity, and as it passes the center of gravity it makes connection again on the other side, and when it reaches the same angle the current is cut off. The line of contact at each swing of the pendulum is just long enough to give sufficient force to overcome the lost motion. One tooth marks the revolution of every minute, and by a very simple device this wheel is connected with the dial wheels. The advantages to this clock are that it never needs winding, but will run as long as the battery lasts, which is from 12 to 24 months.

Who Invented the Lightning-Rod?

An English Assyriologist recently announced that he had unearthed a furnace thousands of years old, in which the hot blast had undoubtedly been used. Just as this archæologist seeks, rightly or wrongly, says *Industries and Iron*, to deprive Neilson of the credit of his invention, so the German Egyptologist, Herr Heinrich Brugsch, endeavors to prove that Benjamin Franklin was not the deviser, but merely the rediscoverer, of the lightning-conductor, as he claims that he has abundant testimony that the ancient Egyptians used a form of this useful instrument for protecting their temples against discharges of atmospheric electricity.

A New Electric Gun.

The inventor of melinite, M. Tuapin, has submitted to the French War Office an electric gun, which he states is capable of discharging 25,000 projectiles in five minutes, and has a range of several miles. The apparatus is comparatively light weight, so that it can be drawn by two horses and managed by four men. The projectiles are small shells, charged with a secret preparation, spreading death for many yards around.

To Transmit Power.

An important scheme for the transmission of power is now being considered in Switzerland. It is proposed to dam the River Reuse and convey the water to a storage and distributing reservoir having a capacity of 3,000,000 cubic feet, and situated at Combe Garrot. From here the water is to be distributed to the communities of Neufchatel, Loche, and La Chaux-de-Fonds. The head available will be about 300 feet, and the conduits will have a capacity of 177 cubic feet per second, though the flow of the river varies between 100 and 60 cubic feet per second only. The power will be distributed from the turbine stations by electricity, distances being from 7½ to 11 miles.

Useful Information.

Big Pumping Feat.

For 16 months pumps have been at work drawing the water from Lake Angeline, near Ishpeming, Mich., and the water is all gone. The lake lies near the southern part of Ishpeming, covering 160 acres, and was 70 feet deep in the middle.

Under the bed of the lake lie the largest iron ore deposits ever discovered. The ore was discovered some ten years ago, when a diamond drill was set on the frozen surface of the lake one winter and a hole drilled 600 feet down below the bed of the pig iron. Large ore bodies were cut by the drill, and the three mining companies owning the ground under the lake began devising means to secure this valuable ore.

Work was begun last spring before the snow left the ground, when a rotary pump with a capacity of 20,000 gallons per minute was anchored in a barge in the center of the lake and began pumping water into a big flume elevated 20 feet above the surface of the water. The pump has been going day and night, allowing for occasional breakdowns, and the water has only recently been drained all out. Now, however, a serious question remains to be settled. There is a bed of mud from 2 to 40 feet deep over the bed of the former lake. This mud is kept moist by underground springs, from which the water bubbles up. Big tubular standpipes, pierced with myriads of small holes hardly larger than a needle's point, are being forged into the mud, and into these the water filters and is pumped out. The surface of the bed of the lake is more treacherous than quicksand, for any heavy object thrown on it is quickly engulfed. Several narrow escapes from drowning have taken place. It will take 16 months longer to get rid of the mud.

Statistics of Thirst.

There is, at first, something very appalling in the record of the drink consumed in large cities. For instance, the statement was lately put forward at the London Mansion House that the city of London drank every year 45,000,000 gallons of malt liquor, 8,000,000 gallons of wine and 4,500,000 gallons of spirits. The announcement startled the public until an optimistic mathematician brought a little arithmetic to bear on the figures, and forthwith altered their significance.

He found that London has a population of close upon 6,000,000. About 2,000,000 of these are children, who, for the purpose of argument, may be classed as taking no alcohol at all. Also, for the purpose of argument, it may be assumed that of the remaining 4,000,000 2,000,000 are total abstainers, leaving the drinkers of the city numbered at 2,000,000. This would give an annual consumption per head of 22½ gallons of malt liquor, 4 gallons of wine and 2¼ gallons of spirits. Twenty-two and one-half gallons a year is almost exactly half a pint a day; 4 gallons a year would be a very small wineglass daily; 2¼ gallons a year would barely suffice to fill the smallest liqueur glass 365 times. So that the inquiring statistician reached the conclusion that the terrible drink bill of London resolved itself into the fact that the average Londoner takes one glass of beer with his dinner and a very small glass of wine after it, and that before he goes to bed he takes the merest toothful of whisky or some other spirit as a night-cap.—Chicago Record.

Armor Plate and Explosives.

The recent test of the 12-inch nickel-steel armor-plate at Bethlehem, Pa., by Commodore Sampson of the United States Bureau of Ordnance, was a striking example not only of the enormous resistance to rupturing stress in steel plates reached by modern metallurgic methods, but also of the tremendous energy developed by modern projectiles through the use of improved explosives, says the *Engineering Magazine*. The plate was completely penetrated by a 250-pound Holtzer projectile thrown by a charge of 110 pounds of powder, which pulverized the projectile into small fragments upon its impact with the target. The velocity of the projectile at the instant of striking was 2005 feet per second. To gain a better conception of the tremendous energy represented by these figures, they may be reduced to terms of work in foot-pounds. Thus, a projectile of the weight named, moving at the velocity stated, has stored up in it a potential energy competent to the performance of 4,396,910 foot-pounds, or 2198.455 foot-tons. Referring this energy to the weight of the explosive, we find that a pound of the latter must have contained an energy representative of 19.985 foot-tons, or one ounce would represent 1.249 foot-tons. A single grain of the explosive is equal to the performance of 357 foot-pounds of work. These estimates are for net work after deducting losses for windage, friction and resistance of the air.

Curious Freaks of Lightning.

A very singular story is told concerning the vagaries of a mass of globe lightning. A tailor in the Rue St. Jacques, in the neighborhood of the Val de Grac, was getting his dinner one day during a thunderstorm, when he heard a loud clap, and soon the chimney board fell down and a globe of fire as big as a child's head came out quietly and moved slowly about the room at a small height above the floor. The spectator, in conversation afterward with M. Rabbinet, of the Academie des Sciences, said it looked like a good-sized kitten rolled up into a ball and moving without showing its paws. It was bright and shining, yet he felt no sensation of heat. The globe came near his feet, but by moving them aside he avoided the contact. After trying several excursions in different directions it rose vertically to the height of his head—which he threw back to prevent it touching him—steered toward a hole in the chimney above the mantelpiece, and made its way into the flue. Shortly afterward, "when I supposed it had had time to reach the top," the tailor said, "there was a terrible explosion, which destroyed the upper part of the chimney and threw the fragments on to the roofs of some of the adjoining buildings, which they broke through."

How Sea Birds Quench Their Thirst.

The question is often asked, "Where do sea birds obtain fresh water to slake their thirst?" But we have never seen it satisfactorily answered until a few days ago. An

old skipper, with whom we were conversing on the subject, said that he had seen these birds at sea, far from any land that could furnish them water, hovering around and under a storm cloud, clattering like ducks on a hot day at a pond, and drinking in the drops of rain as they fell. They will smell a rain squall a hundred miles or even farther off, and scud for it with almost inconceivable swiftness.

How long sea birds can exist without water is only a matter of conjecture, but probably their powers of enduring thirst are increased by habit, and possibly they go without water for many days, if not for several weeks.—Golden Days.

Railway Earnings for Six Months.

Railway earnings in the United States for the six months ending June 30, 1893, show increases in both gross and net, according to statistics covering 121,173 miles, or 69.2 per cent of the total mileage of the country, collected by the *Financial Chronicle*. The results of operations for the six months is given as follows:

	1893	1892.	Inc. P. C.
Gross earnings	$488,662,810	$423,542,661	3 53
Operating expenses	311,811,013	297,978,698	4 60
Net earnings	$126,821,797	$125,563,963	1.00

Classifying the roads by groups, it is found that four—the New England, Trunk lines, Northwestern and the Pacific—exhibit decreases in net earnings varying from 5.37 to 1.28 per cent, all others showing increases over the corresponding period of 1892. The largest increase in net is shown by the Middle Western group—14.49 per cent. It is to be remembered in considering these figures the present business prostration did not begin until after July 1st, so that its effects are not felt to any great extent in railway earnings of the first half of the year. At present earnings are showing large decreases.

Big Steel Wire Cable.

One of the largest steel wire cables on record, having a continuous length of 4½ miles, or one mile longer than a similar cable which was manufactured a few months ago, has just been completed by the Globe Works, Bankhall, Liverpool, England. The total weight is over 25 tons. It is 3¼ inches in circumference, and is made upon the Lang's patent principle, with 42 wires of No. 10 standard wire gauge of the finest quality of improved patent crucible steel wire, the tensile strain of the cable exceeding 45 tons. The facilities of the firm are such that the whole work, from the commencement of the drawing of the wire to the completion of the cable, was carried out within 14 days, although there were over 220 miles of wire used in the manufacture, the machinery for such heavy work being of special design. The cable is to be used for endless haulage and to transmit loads of 40 to 60 tons at a speed of eight miles per hour.

Cleaning Asphalt Pavements.

The block system as applied to the cleaning of the asphalt paved streets of Buffalo, N. Y., is an eminent success, says the *Commercial* of that city. This block system, however, is really only supplementary to the general cleaning system in the business part of the city, and is intended to gather up all droppings, scraps and refuse scattered between regular cleanings. A man or boy now uses an iron scraper to gather into piles the refuse, and from there it is regularly taken up by carts. The present force numbers 49 men, at 15 cents per hour, with six carts. Hereafter the dirt is to be placed in special barrels instead of being gathered into heaps, and these barrels will be emptied by carts as fast as they can make their rounds. The proposed system is practically the London dust-bin and sweeper system long in use in the busier streets of that city.

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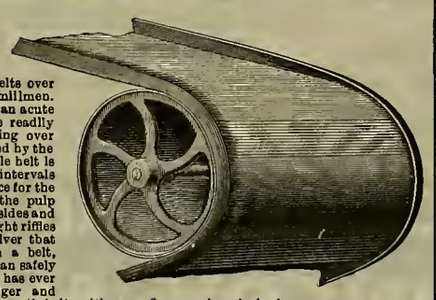

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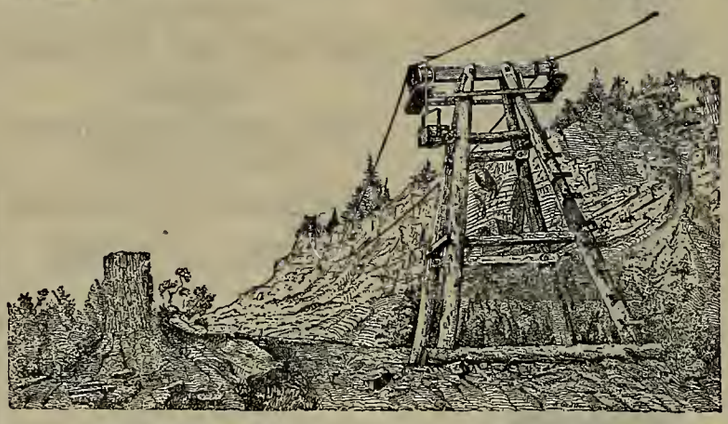

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Coast Industrial Notes.

—German and English stockholders are looking over the Southern Pacific lines in California. The placing of the new loan called them here.

—The Idaho Commercial Company, at Weiser, failed last Friday. Assets $60,000 and liabilities $40,000. The company did a hanking and mercantile husiness and was a leading concern.

—The Davie Ferry and Transportation Company's opposition line hetween San Francisco and Oakland has absorhed the Whitney Express Company's hay steam line and express husiness.

—The Northern Pacific Railroad Company have let a contract to John Nolan for filling under remaining bridges on the Pacific division at a cost of $35,000. The road is being put in shape for faster time.

—The San Francisco city architect is preparing plans for a new huilding to he erected on the grounds of the City and County hospltal. The new structvre will cost $20,000, and will be a dormitory for the nurses.

—Homer Laughlin, an Eastern capitalist from Liverpool, O., is at Oceanside looklng over the headwaters of the San Luis Rey, with a view of takIng the water to supply the city and the surrounding lands. The city offers a honus of $30,000.

—A large proportion of the surplus cattle of Eastern Oregon will he shipped to Omaha this fall. Fifteen thousand head have been hought in Malheur county for shipment to that point, and ahout the same amount in Umatilla and Morrow counties.

—There is pending hefore the trustees of Watsonville an ordinance fixing an annual license of $50 per annum on sewing and washing machine agents who have no fixed place of business, and a license of $10 per day and $250 per month on hohhy horses.

—The Government hoat Seizer is thornughly opening the channel of the upper Sacramento for free service for the nsual run of river steamhoats, removing all snags, opening the hars to a wide and deep capacity, and placIng wingdams to control the current where needed.

—Governor Hughes has appointed the following Arizona delegates to the Southwestern Irrigation Congress, which will meet in Los Angeles Octoher 10th: Edward M. Boggs, Tucson; Dr. S. M. Hurley, Florence; Jerry Millay, Phœnix; I. L. Vauderworker and L. A. Hicks, Yuma.

—Alhert Dihhlee, for many years president of the Giant Powder Co., has resigned and Mr. Elliott M. Root of Sanderson & Root has heen elected to the position at the head of the big explosive corporation. Increasing years and continued ill health were the causes of Mr. Dibhlee's leaving the presidency of the company.

—All work has heen stopped on the San Diego and Phœnix railroad. The main cause is attributed by President Reed to the apathy of the people of San Diego. He recalled the magnificent offer of one prominent capitalist, who offered to subscrihe as much cash as any one of a dozen men, and who, when the time came, hacked up his word to the extent of $5.

—It is alleged that a hrick trust has heen formed in San Francisco. All the principal yards hereabout have heen taken In. There are those of the San Jose Brick Company, the Remillard Company, the Fortln, the Peterson Company, and the yards of Sreishman. It is said that others also are In the combine. The prices fixed upon are $9 a thousand for hard hrick and $8 for the red.

—The San Francisco Fire Department has recommended an award of the followiog contracts: For furnishing 2½-inch hose he awarded to Harry T. Hart at 80 cents a foot; that for 3-inch to W. T. Y. Schenck at $1 30 a foot, while it is proposed that Main & Winchester he allowed to furnish the harness needed in the department for $99 for a douhle set, $66.50 for a single set and $60 for a huggy harness.

—The Oakland, San Leandro and Haywards electric line has asked for a franchise from the Alameda county supervisors from the San Leandro road southerly on Fruitvale avenue to a point 100 feet south of the Southern Pacific railroad track. The Highland Park and Fruitvale road has already a franchise over this territory. The supervisors will receive bids for the proposed franchise till Octoher 30th.

—There is talk in San Francisco of the consolidation of the principal cahle railways, with a capitalizatlon of $16,000,000. The roads reported to have agreed on consolidation are the Southern Pacific's several street car lines and the Howard street, Third and Montgomery, Post, Ellis, etc., cahle lines of the Omnihus system, Fourth and Kearney, and the Market-street horse cars of the North Beach and Mission.

—Some idea of the extent to which sturgeon fishing is to he engaged in on the Columhia river this season can he formed from the fact that 60,000 large stnrgeon hooks recently arrived at Portland from Scotland were all sold hefore heing unpacked and orders placed for 80,000 more. One fisherman ordered 30,000 hooks. Hooks are placed 14 inches apart on lines suspended a foot from the hottom of the river, no halt heing used.

—Capitalists have recently interested themselves in the superh hituminous rock deposits of San Luis Obispo county. They possess improved methods of handling and preparing the rock, and they own tramways, wharves and vessels, either in actual use to-day or in course of construction. The action of these gentlemen is directing the attention of contractors throughout the State to the importance of the San Luis Ohispo bituminous rock industry.

—D. N. Rideout of Marysville has resigned from the presidency of the Mercantile Lihrary, and it is said that Edmund Tauzsky, the lawyer, will he elected to fill the vacancy. The finances of the assocation are very low and the expenses exceed the income hy just $350 a month. That amount is the interest paid monthly on $65,000 horrowed from the Hihernia Bank to complete the new huilding. It is proposed to estahlish a hranch lihrary down town.

—Fire was discovered in Vair's tinsmith shop, at Kameloops, B. C., ahout 4 A. M., Sunday. The following places were destroyed: Vair's tinshop; Prior & Co., hardware; Stephenson, jeweler; Simmons, contractor; Duhammel, harher; Whittaker's law office; Fortune's store and dwellinghouse; J. A. Mara's residence; Sinclair's fruit store; Quinn, hoots and shoes; Chong Lee, general store; Kwong On Wo Co., and five other Chinese houses. The loss will exceed $100 000; Prior & Co's loss heing estimated at $50,000.

—The Pacific Mail Steamship Company has heen permitted hy the Postal Department to annul their contract for carrying the mails hetween this port and Panama. This action was taken hy the steamshlp company hecause it wants to meet as a free lance on the seas the North American Navigation Company. The annulment takes effect on the 30th of this month. The Pacific Mail received $1 per mile for carring the mails. Hereafter the postal officials will share the work between the North American and Pacific Mail companies.

The Midwinter Fair management has decided to award contracts for the Manufactures and Lihera Arts buildIng and for the Mechanical Arts huilding. Smilie Bros. secured the hig structure for $107,300. R. P. Hurlhurt was awarded the Mechanical Arts at $64,400. Each of the contracting firms agreed to take hack the huilding at the conclusion of the fair in part payment of the price. Smilie Bros. will allow $7500 for their strocture. Thls will reduce its actual cost to $99,800. The return valuation of the other huilding was deducted from Hurlhurt's hid, which is $64,400 net.

—The capitol commission of the State of Washington advertises for plans and designs of a new capitol, to he suhmitted by Decemher 14, 1893. The said huilding is to he fireproof, and to he huilt of stone, hrick, iron or steel as far as practicahle, and to he equipped with the most approved methods of heatlng, drainlng and ventllation. The entire cost of the building complete, including all fixtures and appliances, ready for occupancy, shall not exceed the sum of one million ($1,000,000) dollars. The architect suhmitting the hest plan shall he chosen as official architect. Second. third and fourth prizes of $1500, $1000 and $500 respectively are offered.

—Moore & Smith, one of the oldest and largest lumher firms in San Francisco, gave notice recently that they were unahle to meet their engagements, amounting to ahout $600,000. The Kings River Lumber Company in Fresno county and the Port Discovery Mill Company, which are both incorporated with the parent institution of Moore & Smith, are involved equally in the emharrassment. The principal creditors are: The Bank of British Columbia. which stands in for $160,000; Alfred Borel & Co., $220,000; Bank of California and others for various amounts aggregating the halance of the $600,000. The greater part of this is fully secured.

—The Veteran's Home Assoclation has let the following contracts for construction of various huildings at Yountville: Carpenter work—Dining-room and kitchen combined, Leiter & Prugh, Oakland, $8717; commaod. ant's house, H. E. Jones, Oakland, $3650. medical director's house, H. E. Jones, Oakland, $3280. Painting—F. M. Farwell & Son, Oakland, $1646. Plumhing, steam and gas fitting — Diningroom and kitchen, P. F. Ward, San Francisco, $250; commandant's house, J. T. Cosgrove, San Francisco, $336.50; medical director's house, J. W. Ruddock, San Francisco, $315. Tinning—On medical director's and commandant's house, J. T. Cosgrove, San Francisco, $75; dining-room, J. W. Ruddock, San Francisco, $100.

—"We have just been awarded a contract to straighten out the circuitous channel at Twenty-one Mile slough, on the San Joaquin river," said President McMullen of the San Francisco Bridge Company to a reporter the other day. "It is a sequence of the work we have heen doing in the neighhorhood of Stockton, and will go far toward straightening out the tortuous channel of the San Joaquln hetween San Francisco and that point. The present contract contemplates a cut of ahont 3700 feet, and will involve the removal of fully 200,000 cuhic yards of earth. The cut will he 24 feet wide, and will give the tidal water a chance to act upon the depth of the new channel. We are figuring on 8¼ cents a yard for the work."

—The California rail freight movement this season is much larger than at a corresponding date last year. The cars go East laden with canned goods, drled fruit, heans, sealskins and the like. The salmon pack has hegan to arrive from the north, and is helping to swell the volume of husiness. The Southern Pacific and Atlantlc & Pacific lines are taxed to their utmost to handle the business offered. The shipments aggregate more than 150 carloads a day from the northern part of California. Of deciduous fruit alone 709 cars were sent east via Ogden during the first 15 days of the present month. Wheat is piling up rapidly at Port Costa and Stockton, the receipts aggregatlng not less than 200 carloads a day for the two places.

—The Treasury Department at Washington gives the following as the value of the exports of hreadstuffs for the month of August from Pacific Coast districts: Puget Sound, $31,167; San Francisco, $2,271,456; Willamette, $162,299; total, $2,464,931. Barley shows a decided increase in the exports, heing more than three times the amount exported in August of last year. Corn shows a decrease. Oats have gained handsomely and so has wheat, hut the exports of wheat flour have fallen off. From the San Francisco customs district the figures, as compared with those of last year, show great gains in the exports of cattle and heef products, hut hogs and hog products show a decided decrease. Dairy products are also among the exportations which have fallen off, though on the whole provisions have gained.

—Two cottages for girls and a school and a girls' industrial huildlng are to he erected at Whittier, and plans and specifications and hids are asked for. Blds will he received as follows: For doing the carpenter work and furnishing the materlals therefor; for doing the mason work and Iron work and furnishing the materials therefor; for doing the plaster work, including lathing, and furnishing materials for such lathing and plaster work; for doing the plumhing and gasfitting work, and furnishlng materials therefor; for doing the tlnning and galvanized iron work and metallic-roofing work, and furnishing materials therefor; for dolng the painting work and furnishlng materials therefor; for doing the electric work and furnishing the materials therefor; for doing the heating work and furnishing the materials therefor. All bills must he sent to the secretary of said Board of Trustees, Dr. Walter Lindley, at Whittier, Cal., hefore 11 o'clock A. M., Monday, Oct. 16, 1893.

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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ROCK FROM THE MAYFLOWER. — Amador *Ledger*, Sept. 15: The mill on the Bnnker Hill started op on Thursday morning on rock from the Mayflower shaft. The people of Amador City and vicinity are delighted with the prospect of the Bnnker Hill putting on a large force of men.

B. F. Taylor, of the Argonaut, has six men at work on that property building roads and attending to other preliminary work. They soon will have an engine on the grounds and commence work on the shaft, which has already been located.

Work is being poshed forward in the Clinton Consolidated with pleasing results. They have jost struck the so-called "old man" ledge in the 700-foot tnnnel they have been working in for some time. The ledge is about 300 feet below the sorface and prospects well.

At the bottom level of the Gover, aboot 1000 feet vertical depth, a ledge of qoartz bearing $20 rock was encountered, on which they are drifting each way. Soperintendent A. B. Call has ordered timbers for 500 feet of ahaft, the company having concluded to sink 500 feet more, at the ssme time keeping their mill running. The managers of the mine propose to snbstitute their hoisting machinery with electric appliances in a short time. The remarkable success of their electric pump has been so satisfactory that they feel satisfied that electric machinery throughoot the mine will be a grand stroke of economy. A drain tnnnel, driven from the mill site to the shaft, will strike the ahaft 131 feet from the mouth, thus saving the last lift of water and allowing the snrface water, that was so annoying last wioter, to ron off from the mine. Their electric pnmps now have a capacity of 234,000 gallons per 24 hours, and with the addition of another pump and a larger dynamo, this capacity will be doubled. One pump is now at the 200 and the other at the 500 level. When the new pomp arrives, which, by the way, will be the largest electric pump in operation, it will be placed at the 500 level, the larger of the two old ones at the 800 and the small one at the 1000. In driving the drain tunnel a short time ago, a ledge of quartz was encountered, about 500 feet from the ledge in the shaft, which prospects very well. In truth, the Gover seems to have reached an era of prosperity for which its owners and managers have striven for years.

Butte.

THE HORSESHOE.—Oroville *Mercury*, Sept. 13: N. F. Campbell, who has been at work all summer at the Horseshoe mine, on the Little North Fork, is in town. He informs us that there are now abont 35 men employed there. This mine, which is being opened up solely by the capital and enterprise of C. E. Ertz, late of Boston, is sitnated some six miles east of Merrimac, on the Little North Fork of Feather river. The river at that point makes a sharp hend almost in the shape of a horseshoe. Owing to the roughness of the country, this hend has never been worked. Mr. Ertz has now run a tunnel through the neck of land at the heels of the horseshoe which will enable him to lay dry the hend nearly a mile in length. The tunnel is about 150 feet long, and a head dam has been put in, the water being conveyed to the mouth of the tunnel throogh about 200 feet of flume. The tunnel is eight bv ten feet, and in the 150 feet has a fall of over 70 feet, so that it will carry a vast volome of water. The tunnel is now completed and the water has been torned in. A long line of ditch and flume is now being bnilt to wash a har in the river which has been laid bare. As the river above and below has heen very rich, Mr. Ertz confidently expects to he well repaid for his expenditure of time and money. As the season is pretty well advanced, it is probable that active mining will not commence nntil next season.

Calaveras.

MILL RUNNING.—*Mountain Echo*: The mill on the Jooes mine is ronning steadily, crnshing ore from the lower levels. The fact that 20 additional stamps are being put in the mill strongly indicates that the ore is good and the business prosperous. If there is any gold in a mine, Mr. Roberts, the superintendent, knows how to get it out as cheaply as the next man.

AT THE BOLITHO.—*Mountain Echo*: The Bolitho mine, situated between Carsons and Angels, owned by Osborn & Hardy, may now, with safety, be ranked amoug the leading qoartz mines of Calaveras county. It is tapped by three tunnels at different points, one of which is in 165 feet and taps the mine at a depth of nearly 200 feet, where the vein or lode is 40 feet wide, and, hy a thorough milling test, yielded a fraction less than $4 per ton. In addition to which there are a nomber of small veins which are immensely rich and carry sulphnrets of a very high grade. The larger vein also carries a large per cent of sulphnrets which prospect well.

Humboldt.

COAL, BUT NO MONEY.—Bloe Lake *Advocate*: The coal recently discovered on the place of Mr. David Powers near town is said to be of a good quality; bot Mr. Powers declares it impossible for him to work the mine on account of lack of means. A force of men were engaged in working on it lately and attained a depth of 30 feet, but they abandoned it, as the vein is too deep. The ledge of this coal, which possibly runs all throngh that little hill from Glendale to Korbel, is between 200 and 300 feet deep. If a company had charge of the mine, it might he possible that satisfactory results would

be reachsd. But for the pressnt, the mine will remain in its nndeveloped stats.

Mariposa.

STRUCK A POCKET.—*Gazette*, Sept. 16: Messrs. Hope & Sample, of Black Bart mine, unearthed a pocket of about $3000. This mine has yielded some very rich pockets.

Nevada.

THE MISTLETOE.—*Tidings*: Mr. G. C. Haskell, one of the owners of the Mistletoe mine, which is near the village of Rough and Ready, reports that the shaft is down only 30 fset, hut several profitable clean-nps have been made. He thinks it will prove a good property, and that there are several other paying ledges in that locality.

MINES TO START.—Grass Valley *Union*, Sept. 14: P. F. Lillian, superintendent of the German mine, was engaging a gang of men at the county seat yesterday to begin operations in that mine. A new 10-stamp mill was taken to the gronnd by wagons. The German is sitnated about three miles north of Eureka on the river, and is a very promising property. Capt. Webber will begin operations on the Ynha mine this week. The Ynba is situated in Washington district. Mr. Wehher is a wsll-known captalist and an experienced miner, and when he takes hold of a mine it generally pays.

A NEVADA CITY MINE SOLD.—*Transcript*, Sept. 16: One of ths sales which has been on the tapis for a fsw weeks psst was consummated Friday. The Spanish mine, which was owned hy A. R. Lord and A. S. Lord, was sold to Colgate & Co. of New York. It is said the price paid for the property was $55,000. A. L. Beghie, one of the most experienced miners on the coast, was placed in charge of the property Saturday morning. It is nnderstood that new machinery will at once be erected and the mine worked upon a large scale. In addition to this mine, Colgate & Co. are working another mine near the Spanish which bids fair to be a good one.

We learn that Schuster & Co. of San Francisco, who recently purchased the McCoy property near the Spanish mine, and known as the North Merrifield, are making arrangements to work this property for all it is worth. As an evidence that the North Merrifield will be worked on a large scale it is only necessary to state that the new owners of this property are the largest stockholders in the Champion and they do not believe in simply scratching around a mine.

THE MOEILE.—*Telegraph*: The Mobile mine is situated between the Enreka ground and the Spring Hill. Some work is now beiog done on the Mobile and the prospects are a great deal more than flattering. One of the owners was offered $1500 for his interest in the ledge and the offer was refnsed. What little work that has heen done on the propertv is said to have developed a very fine ledge which shows gold freely. Mons. A. Ganthier and Wm. Dihble own the ground.

BEING OPENED UP.—Nevada *Telegraph*, Sept. 15: Messrs. Fricot and Cbavanne have hegun active mining operations aronnd Grass Valley. They are now having a tunnel rnn on the Independence, situated east of the Maryland. The Independence is the extension of the Maryland, and it is thought that tbe tunnel will tap the ledge in a short while.

The same gentlemen have commenced work on the Fair Play mine. The Fair Play is located on the Colfax road, not far from Joe Bonivert's ranch. The property was owned by Mons. Jnles Fricot, and he did the only work on it abont 18 years ago.

Orange.

A COAL MINE.—Orange *Post*: For a number of years coal has heen mined on a small scale in the hills up the Santiago creek. The smallness of the vein, the indifferent quality of the coal and the distance from railroad transportation have operated against the development of the mines. Bnt considerable activity ie displayed at the present time in the mines owned and operated by Supervisor Yoch and T. Harris, perhape others. These mines are situated north of the creek in a little side canyon three or four miles ahove the picnic gronnds. The vein of coal is abont eighten inches thick and could not he mined at all were it not set on edge at a comfortable inclination for work. There are ten men at work heeides the snperintendent and they take out ten tons of coal per day at a cost of ahont $2 per ton. The work is done by contract, the men doing all that is necessary to keep the tunnel clear so as to deliver the coal ontside. Little timhering is needed on account of the strata of rocks and coal standing on edge. Althongh the vein of coal is thin, it extends across the hills five or six miles; while the qnality is not the hest, it makes a fair fnel and helps to keep down the prices on other coals; notwithstanding the output is small and the wages moderate, the indnstry enahles a number of families to get a living beeides affording a modest retnrn on the investment for the owners of the mine.

Placer.

PEOSPECTINO A LEDOE.—*Herald*, Sept. 16: Cal. McCnllough and Oliver are prospecting a ledge a short distance above Greenwood in El Dorado county. The vein is seven feet thick and at a depth of 18 feet they have struck rock that shows gold all throngh it. McCnllongh had a specimen in Auburn yesterday that was beautiful to look at.

Plumas.

ACTIVE OPERATIONS.—*National Bulletin*, Sept. 15: On Monday the directors of the Qnincy Mining and Water Co. met in San Francisco and elected Chas. R. Thompson of Spanish Ranch assistant enperintendent. A. B. White of San Francisco is the general superintendent. Active operations will begin at once on the ditch recently purchased of the Plumas Mining and Water Co. It will be placed in repair as speedily as possible. We congratulate the new mining company upon its selection of Mr. Thompson for assistant superintendent. He is a gentleman of practical experience in mining, and will nse his ability and energy in the service of his company.

San Bernardino.

A FIVE-POUND NUOOET. — Mojave, Cal., dispatch, Sept. 14: The gold excitemsnt which has been on here in this vicinity for the past three months reached a climax this afternoon when a party named Reed, who has a placer claim at Red Rock canyon, abont forty miles east of here, arrived with a nugget weighing five pounds. It is a beanty, and an old mining expert hsre claims it will assay the finder $1000 worth of free gold. This makes the second nugget found in the placers dnring the last six weeks, the last one weighing over two ponnds and netting ovsr $400. Parties are going to the fields daily and it is the opinion of old miners that mnch richer mines will be discovered soon.

San Diego.

RICH FIND.—A lstter received from Rob Weyms. who is now at Julian, says the San Diego *Union*, states that a most important new find was discovered in the Ella mins by Sid Wilcox. Wilcox, it appears, had occasion to remove some dirt ten feet from the mouth of ths lower works, when his pick struck into decomposed rock. The rock proved to be rich, a low estimate heing $20 to $25 per ton. The vein strnck is fully three fest wids. Wilcox and others have for years been working within 10 feet of this rich hody of ore. In their work they have run a tunnel 600 fest long, and as now appears have been paralleling the rich vein. They will now crosscut the old works to reach the new rock. The mine is conceded to be the richest in the Jnlian region.

Shasta.

FROM IGO.—Cor. *Democrat*, Sept. 13: Messrs. J. Rings and Hnbbard are at present taking ont fine gold ore which assays $200 per ton, and they have quite a large amonnt in sight to stope out. It is all shipping ore, so the boys will make a shipment in a few days to the Selby works.

Gillon and Dnnham are running a long tnnnel on their mine and are in on the vein 110 feet, and have strnck some fine ore which looks good and prospects in fres gold by the hand mortar. They expect to run the tunnel 500 feet bsfore they get to the shaft they have sunk on the mine, which prospects in gold and silver and is high-grade ore.

Mr. E. Ballou is running his mill on the rock he is taking ont of his mine, which is good ore. He is milling it by the roasting and leaching chlorine gas process and is satisfied he can work the gold ores of Sonth Fork district satisfactorily, which will help the gold ledge miners of South Fork and the gold bugs ont.

FROM SOUTH FOEK.—Cor. *Democrat*: The miners of Arbuckle district are making extensive preparations for a winter'e run. The Peg Leg or Snyder ditch, some 12 miles long, is being pnt in order.

The miners on Ronnd Bonlder creek are also getting things in shape for a winter's rnn. A party of Chico prospectors have found several ledges on Brown's creek, lying west of Bullychoop.

Hart's mines at Bnllychoop have been in full hlast for npwards of two weeke. The cyanide process proved a complete failnre and has been abandoned. The ore is being wet-crnshed, run over platee and the concentrates piled up, waiting for the completion of the wet chlorination plant.

At Sunny Hill the Bells are etoping out an ore chnte extending some 200 feet deep from the enrface. The ore sacked runs $450 per ton in gold.

The Joe Davis property ie also being worked hy Sacramento parties. The late run with the Huntington mill gave unsatisfactory resnlts and a stamp mill is to be snbstituted for it.

J. A. Lawrence has a bond on the Doll and Smith gronp for 30 days, and expects to float them in Sacramento.

Ballon's wet chlorination mill is jogging along smoothly, working gold ore, while the McMahon & Reed mill at Robinson's is crushing Crystal silver ore and shipping the concentrates.

Marley & Jaegel have their 5-stamp chloridizing and amalgamating mill running on silver ore.

The Dobelin placer claims, aggregating some 300 acres, are abont to be purchased by San Francisco parties.

Tuolumne.

AT COLUMEIA.—Cor. Sonora *Democrat*, Sept. 15: Frank McKenna, superintendent of the Dnnmore, Bnzzard's Roost and Blasted Hope mines, a gronp of promising properties helonging to Otto Kanig and a syndicate of Dntch capitalists, was in town this week. It ie proposed to increase the capital stock to the amonnt of $10,000. Among the improvements contemplated are a new ten-stamp mill with concentrators, also the erection of a new dam across the river. It is also the intention of the company to pnt in an electric plant below the dam, all the machinery to be rnn hy electricity. The company will also furnish light and power to the towns of Gold Springs, Pine Log and Columhia, and may also extend their wires to Sonora. The power at their command is ample to supply all present and fntnre demands.

Louis Dondero has recently opened up a very rich sink of gravel on his claim at Knickerbocker Flat. Marvelous stories are in circnlation regarding the richness and extent of this new development, but it is impossible to ascertain the full particulars.

Jas. H. Bourland & Co. of Martinez are at present trying their new gold-saving machine, which is designed to catch and concentrate the fine flour gold and other metals which flow away in the tailings, water and slimes from both placer and quartz mines. They have jnst put in a machine in Dondero's and Bosovich's flumes, and also another below the quartz mill on Sawmill Flat, owned by Messrs. Conlin & Graham. The process followed is simple and entirely new, as compared with other machines designed for the same pnrpose.

Miss Winchester has snspended operations on her mine, hut will probably resume work at an early date. She has opened np a hody of gravel which looks very promising and prospects as well.

ARIZONA.

PRESCOTT NOTES.—*Journal-Miner*, Sept. 13: J. R. Liston, who has been in Prescott for snpplies, left for home this morning. He says that the Del Pasco mill is running 12 honrs per day with good snccsss.

C. L. Hnbbs, formerly of Albnquerqns, is engaged in dry washing placer gravel bstween Copper Basin and Sknll valley. He is said to have a machine which gives good results in separating the gold from the gravel.

Brown Brothers have bsen awarded the contract for erecting a 20-stamp mill on the mining property recently purchased by the Hsnrietta Mining Company, in Big Bug district. The price agreed npon is $20,000.

The mill of the McCabe Mining Company, it is said, was started up a few days since and is working satisfactorily. This makes four mills now in opsration in Big Bng district.

Work is progressing rapidly on Dr. Miller's mill, at the Westlake mine, four miles south of town. He has the machinery in position, and expects to start up the mill in abont ten days. Dr. Miller has kept steadily at work for three or four years developing this claim, and snccess is now within sight.

OLD DOMINION AT WORK.—Globe *Silver Belt*, Sept. 9: The Old Dominion Copper Co. resnmed work on Friday of last week, with full shifts at mine and smelter. Coke has been coming in rather slowly this week, bnt thers is a very large quantity en ronte from Wilcox, and the bins at the smelter will soon begin to fill up. No further interruption of work expected.

NEVADA.

White Horse District.

RICH SAMPLES. — Wadsworth *Dispatch*: A *Dispatch* rsporter who has livsd in a mining oamp nsarly all his life and who has seen a grsat many rich specimsns, saw the equal of the best of them among some samples of gold-hearing quartz which David Washeim brought in from White Horse the other evening. It was pure virgin gold like the yellow gold of California and was in the quartz in such a manner that it seemed that if the rock could be sliced off there would be a sheet of gold as thick as a twenty dollar piece. The find ie in a different direction from the trend of the ledge of the Jim Blaine and proves moet satisfactorily that there are a nnmher of ledges in the district and that White Horse is assnred of permanency.

OREGON.

HYDEAULIC MINE.—Browntown Cor. Rogne River *Courier*, Sept. 14: The Illinois Hydraulic Mining Co. is the firet incorporated hydraulic company in this section of Josephine conuty. It is a Portland company with Capt. Geo. A. Pease, president; E. E. Lawrence, secretary; and H. L. Doney, superintendent of works. Their property consists of some hnndred and sixty acres of gravel deposit on Bollen creek and McDonner gulch, to which they have brought water in ditches, and from the known richness of this section in the past there is a bright ontlook for the fnture. They are now working some six men and will eoon commence opening a new trail to connect with the Browntown trail and postoffice.

TO WORK A MINE.—The Columbia Mining Co. of Grant's Pass have filed articles for the purpose of working the Anaconda mine, sitnated in Applegate district, in Josephine conuty. The amonnt of the capital stock is $100,000. Allen Nevin, A. C. Taylor and Robert Smith are the incorporatore.

PROMISES WELL —Jacksonville *Times*: A quartz ledge has been discovered on one of E. E. Miner'e farms in Gold Hill precinct, which promises very well. It is eix feet wide and grows richer and ie better defined as development progresses. Some of the ore taken from the ledge at a depth of 30 feet was sent to the celebrated Selby Smelting Works of San Francisco, and assayed at the rate of $14.50 per ton. As this mine is located in one of the richest mining districts of southern Oregon, Mr. Miner naturally feels highly elated.

PLACERS ON POWELL'S CREEK.—The Grant's Pass *Observer* says that rich placers are being worked on Powell'e creek, a tributary of Williams creek, in Josephine conuty. There are already 18 claims located on the creek, which cover a distance of ahont five miles and leave abont three and one-half miles farther np the stream yet vacant. There seems to be a rich har at the bottom, which is from 16 to 35 feet wide and very rich. This pay chnte does not seem to have any direct course, hnt runs in all directions along the creek bed. From $4 to $8 per day for each man with pick and shovel has been realized this snmmer from some of the mines. Powell's creek furnishee water the year ronnd. Bedrock is reached at a depth of from two to eight feet, and the ground is easily worked. The gold fonnd is coarse.

WASHINGTON.

A COPPEE FIND.—Ellensburg *Capital*, Sept. 14: Thomas Johneon came down on Tnesday from the divide between the Teanaway and Ingals creek, bringing with him abont 100 ponnds of probably the richest copper ore ever fonnd in the northwest, and fnlly eqnal to the Lake Superior prodnct. It rune from 85 to 90 per cent copper, 30 to 40 ounces of silver, and abont $10 in gold. The best Lake Snperior copper averagee abont 89 per cent. This discovery was made by Cle-Elnm parties a short time ago and they asked Mr. Johnson to examine the find for them.

The Correspondenoe Sohool of Mines, Soranton, Pa.

Ques. What is the Correspondencs School of Mines?

Ans. It is an sducational institution intended to meet ths wants of Mine officials, Minsrs and othsrs interested in Mining who cannot afford ths time to quit work to attend a regular technical school in ordsr to obtain the education which they nesd. It tsaches ths theory of Coal and Mstal Mining and the sciences related thsrsto by correspondsncs.

Ques. What are the branches taught?

Ans. Arithmstic, Search for Coal and other Minerals, Ventilation, Methods of Working, Mine Survsying and Mapping, Mins Mechanics, Mechanical Drawing, First Aid to ths Injured, Mins Legislation, Mins Accounts, Blowpiping, Mineralogy, Assaying, Economic Geology, Prospecting and everything embraced in a Complsts Mining Engineering education.

Ques. Are all these branches taught by mail?

Ans. Yes. There are now over 700 students studying in this school making good progress.

Ques. What qualifications are required to enroll as a student, and whsn can students commence?

Ans. The only qualification necessary is to know how to rsad and write; students can begin at any time.

Ques. How is instruction given?

Ans. In place oi ths text-books of the regular schools the students receivs carefully prsparsd and liberally illustrated Instruction Papers covering all ths subjects embraced in ths full course. These ars accompanied by Question Papers containing questions upon ths subjects treatsd oi and problems based upon the principles explained. The student studies the first Instruction Papsr and writes the answers to the questions and problems in ths accompanying Question Papsr and ssnds his work back to the School. This work is carefully examined by compstsnt Instructors and if errors have bsen made the necessary hslp is given and it is returned to bs done over. The student is furnishsd with blanks with which to write for an explanation of anything in the Instruction Papers he may not understand. The studsnt is kept studying each Instruction Paper until he has a thorough knowlsdgs of ths subject treated of whsn hs recsives a passing mark on ths records oi the School and is advanced to the nsxt Instruction Paper.

Ques. Is it possible to teach Mechanical Drawing and Mapping by mail?

Ans. Yes. The information givsn is full and clear, the exsrcises ars instructive and practical, and the drawings furnishsd to be copied are worked out in detail. Persons who will apply themssives will learn to draw and plot.

Ques. How is Surveying taught by mail?

Ans. The subject oi Mine Surveying is sxhaustively treated of in three Instruction Papers; in the second of thess clear and full instruction is given as to the use of the Surveying Compass. We ssll a first-class instrument complete with tripod for $19.00. This can be bought by one student or by a club of students and used for practice or to do the regular work about the mines. Or we loan Surveying Compasses to students for practice while studying Surveying, for a small rental.

Ques. What advantages has this method of study over that of the regular School?

Ans. An education is procured without leaving home or losing time from work. The student can take his own time for study. He has his teacher always at hand. He can advance according to his ability and time, without reierence to the other students. Should sickness prevent him from studying he does not lose standing. The cost of the Scholarship is less than tuition in other Schools. The best way to remember a thing is to write it down.

Ques. What are the Scholarships?

Ans. The branches taught in the School are divided into four so-called Scholarships. Holders of Complete Mining Scholarships are entitled to instruction in Arithmetic, Search for Coal and other Minerals, Ventilation, Modes of Working, Mine Surveying and Mapping, Mine Mechanics, First Aid to the Injured, Mine Legislation and Mine Accounts. The Mine Mechanical Scholarship embraces Arithmetic, Mine Mechanics and Mechanical Drawing. The Metal Prospector's Scholarship includes Blow-Piping, Mineralogy, Assaying, Economic Geology and Prospecting. Holders of the Full Scholarship are entitled to instruction in all the foregoing branches.

Ques. What are the prices of Scholarships?

Ans. The Complete Mining Scholarship costs $35 in advance, or $40 in installments. The Mine Mechanical Scholarship costs $25 in advance, or $30 in installments. The Metal Prospector's Scholarship costs $20 in advance. The Full Scholarship costs $50 in advance, or $55 in installments.

Ques. How are the installments paid?

Ans. Ten dollars with the application for admission and the balance in monthly installments of $5 each.

Ques. If a student is unable to pay his installments promptly does he lose his Scholarship and the money he has paid?

Ans. No. If on account oi sickness or any reasonable cause a student is unable to pay promptly, the time of payment is extended.

Ques. What are the other expsnses connected with the Course?

Ans. Only those of postage and stationery and that of the instruments and material to do the Mapping and Mechanical Drawing. By arrangement with The Technicsl Supply Co. of Scranton, we are able to furnish students with these at very reasonable prices.

Ques. Are students required to purchass text-books?

Ans. No. The Instruction Papers form a complete text-book and are all that are necessary.

Ques. Are Diplomas given to students completing the course?

Ans. The graduate receives a Diploma stating that he has completed the course of study embraced in his Scholarship, and that he has successfully passed an examination in all the branches.

Ques. For whom is this School intended?

Ans. Miners, mine foremen, fire bosses, engine drivers, pumpmen and surveyors, and all connected with the mining industry who are anxious to advance. It is an opportunity for them to obtain the technical education necessary to secure better positions and better pay. It is the only way to get an education without leaving home or quitting work.

Ques. Does it require a long time to complete the course of study?

Ans. No. The Instruction Papers are carefully and concisely written by competent mining and mechanical engineers. Everything unimportant is omitted, and only that retained to make clear to the student what he must know. The course is as short as is consistent with thoroughness.

The Complete Mining Course requires for those who can only devote a few hours after work to study about 18 months; the Mine Mechanical Course 12 months; the Metal Prospector's Course 2 months; and the Full Course 2 years.

Ques. How can I obtain more information about the School?

Ans. By writing to The Correspondence School of Mines, Scranton, Pa.; they will gladly send you a free Circular of Information which contains all particulars of the Course of Study, Method of Instruction, Terms, etc.

Market Reports.

The Markets.

SAN FRANCISCO, Sept. 21, 1893.

The silver market has been very steady during the week, closing quite as strong as several days since. The feature in metals has been the advance in tin. Lead holds its own at the recent advance.

Copper and Silver Crisis.

The position of the copper market is agreed oo all hands to be ahnormal, says London *Money and Trade*. While the visible supply is small—smaller than in any August since 1884—and the production has been generally reduced, prices have touched a lower level than in 1889, and do not materially exceed the ruinous range of values recorded in the years 1886 and '87, when so many copper mines had to shut down. At the present moment, indeed, a good deal of American copper is being sold here below its productioo cost, the reason being that the crisis brought about by the silver question in the States has necessitated whatever was markeiable being turned ioto money. It is not likely, however, that the present situation will continue long. So soon as affairs are straightened out in America there is certain to be a sharp advance in the price of the metal, which is oow selling at a ridiculously low figure.

Coinage.

The coinage of the San Francisco mint In August was as follows:

Descriptions.	Amount.
Double Eagles	$2.500,000
Half Dollars	100,000
Quarter Dollars	20,000
Total	$2,620,000
January	3,100,000
February	2,640,000
March	1,650,000
April	1,310,000
May	1,740,000
June	1,748,433
July	None.
Seven months	$14,808,433
Same time in 1892	15,573,203
Decrease to 1893	$764,770

The total for the same time in 1891 was $21,809,-011.

Silver and the Metals.

NEW YORK, Sept. 21.—Following are the closing prices for the week:

	Silver in London.	N. Y.	Copper.	Lead.	Tin.
Thursday	34⅛	73¼	9 62½	3 85	20 20
Friday	34⅛	73¼	9 62½	3 90	20 35
Saturday	34¼	74⅛	9 62½	3 85	20 55
Monday	34⅜	74⅛	9 62½	3 90	20 50
Tuesday	34½	74¾	9 75	3 90	20 55
Wednesday	34¼	74⅛	9 62½	3 80	20 80

San Francisco Metal and Coal Market.

ANTIMONY.		QUICKSILVER.	
Per lb	— @ 13	Home trade, pr. flask	40 50 @41 00
BORAX.		STEEL.	
Refined, in car lots	— @ 7¾		
Powdered, do	— @ 7¾	English, lb	— @ 18
Concentrat'd, do	— @ 6¾	Canton tool	— @ 8½
All grades jobbing at advance.		Bl'k Diam'd tool	8½@ 15
COPPER.		Pick & Hammer	6½@ 10
Bolt	23 @ —	Machinery	4 @ 5
Sheathing	23 @ —	Toe Calk	— @ 4½
Ingot, jobbing	— @ 20	PIG TIN.	
Do, wholesale	15 @ 15	Spot ℔ lb	21½@ 22
IRON.		COAL.	
Bar, base	— @ 2½	SPOT FROM YARD—PER TON.	
Norway, base	— @ 4½	Wellington	8 00
PIG IRON.	Spot.	Orela	7 50
		Nanaimo	6 50
Eglinton ℔ ton	—@—	Gilman	6 00
Glengarnock	27 00@—	Seattle	6 50
Am. Soft, No. 1	25 00@—	Coos Bay	5 50
Shotts No 1	27 00@—	Cannel	9 00
Puget Sound	—@—	Egg, hard	12 00
Clay Lane White	30 00@—	Wallsend	7 25
Langloan	27 00@—	Scotch Splint	8 00
Gartsherrie	27 00@—	Brymbo	7 50
Barrow	—@—	West Hartley	7 50
Cargoflect	—@—	TO LOAD—PER TON.	
LEAD.		Australian	6 50@—
Pig	— @ 4½	Liverpool Steam	8 87@—
Bar	— @ 5	Scotch Splint	7 00@—
Sheet	— @ 6	Cardiff	7 00@—
Pipe	— @ 5½	Lehigh Lump	10 00@—
SHOT.		Cumberland	8 50@—
Drop, sizes *smaller* than B, ℔ bag of 25 lbs	$1 75	Egg, hard	9 00@—
		West Hartley	7 50@—
Do do, B and *larger* sizes ℔ bag of 25 lbs	2 00	COKE.	
		English, to load	$9 50@10 00
Buck, Balls and Chilled do, ℔ bag of 25 lbs	2 00	Do, spot, in bulk	—@12 00
		Oo, in sacks	—@14 00
		Cumberland	9 50@—

The Stock Market.

SAN FRANCISCO, Sept. 21, 1893.

The refusal of the Comstock miners to make any concessions in the matter of wages depressed the stock market for a great part of the week; hut the action of the Gold Hill miners in accepting the reduction (from $4 to $3.50 per day) bad a more favorable effect. Yesterday, in the Comstock market, husiness was more active at the 9:30 session and prices were higher. Yellow Jacket rose to 45 cents, Belcher to 30 cents, and there was a good demand for Crown Point at 20 cents. At the north end Ophir rose to 80 cents bid and Mexican sold at 65 cents—the highest price for the latter stock in a long time. Consolidated California rose to $1.40@1.45. Other stocks were higher in proportion. At the second session husiness was quieter, hut prices were steady.

It now looks as if the eventual outcome of the wage controversy will be acceptance by the miners of the owners' proposal, or, rather, an agreement to work for $3.50 per day. There is no chance of resumption of active operations otherwise, unless the silver market should take a decided turn for the hetter.

The Consolidated California and Virginia Miniog Company has been notified of a shipment of three bars of bullion, valued at $13,354.41, to the Carson Mint—the first shipment on September account.

During the month of August the Eureka and Palisade Railroad Company received in transit to Salt Lake and Vallejo Junction, Cal., 672 tons of ore, as follows: From Eureka District, 466 tons; White Pine, 296 tons, and Nye couoty, 2 tons. Following were the lots shipped from the Eureka District: From the Hamhurg mine, 228 tons; Eureka Con., 134 tons; Richmond, 42 tons; Delaware, 31 tons and Idaho, 11 tons. From White Pine District—Zoanni Bros., 66 tons; Frank Paul, 36 tons; Mfnoietti, 10 tons; McEllin, 48 tons, and C. A. Mathewson, 46 tons. From July 22d up to September 2d no ore was shipped. The ore shipped last month was fortunately of a generally higher grade than has been mined of late years, much of it being richer in gold and lead.

The Navajo Mining Company of Tuscarora has levied an assessment of 10 cents per share.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, September 21, 1893.

9:30 A. M. SESSION.

100 B & B	50c	100 Ophir	85c
1200 H & N	45@50c	600 Yellow Jacket	45c
200 Mexican	60c		

2:30 P. M. SESSION.

100 Alta	15c	50 G & C	25c
100 Andes	15c	50 Ophir	80c
100 Belcher	30c	100 Savage	33c
250 Challar	25c	100 Y Jacket	45c
200 C. C. & Va	1.35@1.30		

Pacific Stock Exchange.

9 AND 10:15 A. M. SESSIONS.

750 Belcher	30c	450 Justice	14c
100 Bulwer	15c	200 L Wash	8c
100 Con. Cal. & Va	1.30@1.32	600 Mexican	60c
100 Exchequar	10c	100 Savage	33c
800 H & N	45@43c	600 Yellow Jacket	45c

2 P. M. SESSION.

100 B & B	52c	150 S Nev	50c
350 C C & V	1.35@1.30	30 Union	35c
100 G & O	22c	200 Yellow Jacket	45c

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING SEPT. 5, 1893.

504,515—INVALID'S BED—Boden, Peers & Saxon, S. F.
504,563—WIND DEFLECTOR—B. V. Crumrina, Corning, Cal.
504,445—CRATE—Dare & Hall, El Cajon, Cal.
504,522—HOISTING APPARATUS—D. Donahue, S. F.
504,339—ENAMEL—Z. T. Fowlar, Santa Rosa, Cal.
504,574—FEED WATER REGULATOR—W. Gladstone, S. F.
504,576—FIRE ESCAPE—J. L. Gregory, Washoe, Nev.
504,850—HAT—Chas. Harkins, Menlo Park, Cal.
504,578—FLASH LIGHT—J. N. & H. J. Harrison, S. F.
504,693—BUCKLE—J. G. Hoyt, Haywards, Cal.
504,586—BENCH VISE—T. B. Jackson, Salem, Or.
504,590—LIQUID COOLER—W. F. Kausen, Ferndale, Cal.
504,697—CAR COUPLING—George Ker, Portland, Or.
504,863—LUNCH BASKET—L. Mangulne, Cottage Grove, Or.
504,600—GRAPPLE—Manning & Wilson, Marshfield, Or.
504,601—BEET HARVESTER—H. B. Martin, Chino, Cal.
504,359—BEAN THRASHER—T. A. Miller, Stockton, Cal.
504,860—RECEIPT BOOK—J. D. D. Mortimer, Stockton, Cal.
504,632—STAMPING MACHINE—D. F. Oliver, Oakland, Cal.
504,615—RAILWAY CAR—T. E Pope, S. F.
504,616—RAILWAY CAR—T. E. Pope, S. F.
504,624—HOSE CARRIAGE—W. T. Y. Schenck, S. F.
504,629—ELEVATOR SAFETY DEVICE—Schurtz & Swan, S. F.
504,506—MOSAIC ART GLASS—A. Verhagen, S. F.
522,760—DESIGN FOR LADIES' HAT—J. D. Stange, S. F.

FOR THE WEEK ENDING AUG. 29, 1893.

504,191—TRANSPORTING LOGS—W. V. Allen, Chico, Cal.
503,942—GAME—L. H. Buchanan, Pasadena, Cal.
504,205—ENGINE GOVERNOR—G. E. Dow, S. F.
504,211—SHIP'S PAINT—H. Gallinowsky, S. F.
504,605—TYPE-WRITER KEY CUSHION—Graham & Savell, S. F.
504,218—SPLINT—R. Hoppe, S. F.
4,223—TIMEPIECE ESCAPEMENT—J. H. Langhorst, Jackson, Cal.
504,327—AIR BRAKE—W. H. Masterman, Oakland, Cal.
4,231—GANG-EDGER—McIntire & Koefoed, S. F.
504,278—GAGE—C. W. Preston, S F.
504,244—NUT-CRACKER—W. G. Read, Colma, Cal.
504,052—LEAF-TURNER—J. H. & S. H. Redfield, Grant's Pass, Or.
504,254—RAISIN-TRAY TURNER—M. B. Skaggs, Brentwood, Cal.
504,182—BOOKCASE—J. Stimson, Watsonville, Cal.
504,184—OVEN—W. H. Wiester, S. F.
504,260—GAS ENGINE—W. H. Worth, Petaluma, Cal.
22,761—DESIGN—F. Bishop, Los Angeles, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SPRINKLER.—F. E. Caton and F. B. Waring, San Jose. No. 504,965. Dated Sept. 12, 1893. This invention consists of a shallow head into which water nnder pressnre is received. Upon the end of this head is bolted a cover, so that there is a narrow discharge slit around a considerable portion of its periphery. The size of this slit is regnlated by a screw bolt, the cover being elastic and movable by tnrning the bolt so as to regulate the size of the discharge slit.

FLASH-LIGHT BURNER.—Sylvester M. Williams, S. F., Cal., assignor of one-half to J. A. Shepard, same place. No. 504,956. Dated Sept. 12, 1893.

COMBINED CHAROEE, REFLECTOR AND SMOKE ARRESTER FOR FLASH-LIGHT BURNER.—Sylvester M. Williams, S. F., Cal. Dated Sept. 12, 1893.

FLASH-LIGHT BURNER.—Sylvester M. Williams, S. F., Cal. No. 505,014. Dated Sept. 12, 1893.

These three patents cover devices relating to the ignition of combustible powder for making artificial light for photographic exposnres. The first device consists of a folding portable frame, composed of a tnbular central standard and tubnlar side arms connected and commnnicating therewith. These arms are adapted to be extended at right angles with the standard when in nse, and to be folded beside it when not in use. Along the arms are rock shafts carrying cnps which are charged with powder and which, by the rocking of the shafts, throw their contents into gas jets issuing from the hollow arms, thereby making the flash.

The second device consists of a portable reflector carrying a series of charge hoppers with regnlating valves for snpplying the cnps with the powder.

The third device consists of an obstrnction in the month of the cnps, adapted to break np the powder charge in its flight to the jet, whereby ignition is insnred.

MOSAIC ART GLASS.—Adolph Virhaghen, S. F. Dated Sept. 5, 1893. This invention consists of an art glass consisting of a nnmber of independent pieces of glass adherent to the snrface of a bed glass, and a filling in the interstices of a compositon of nowdered glass and a cohesive material adherent to the bed glass.

HOSE CARRIAGE—Wm. T. Y. Schenck, S. F. Sept. 5, 1893. This invention has for its object snch a construction of a hose carriage as to provide for the essy laying np of the hose in a basket or receptacle, with an ontwardly flaring or inclined back portion, whereby the entire space is ntilized and any abrupt bending and injnry of the hose is prevented.

INVALID BED.—Annie Boden, Joseph Peers and Samnel Saxon, S. F. No. 504,515. Dated Sept. 5, 1893. This invention relates to improvements in invalid beds, and it consists of certain novel arrangements of mechanism by which the whole of the supplemental upper mattrass or snpport may be allowed to lie flat npon the lower one, or it may be raised entirely so that changes may be easily made, or the head portion may be tilted np to snpport the patient in a sitting position on the central portion while the foot portion may be partially or wholly dropped to allow one or both feet to drop to the lower mattrass.

HOISTING ANN CONVEYING APPARATUS.—Daniel Donahne, S. F. No. 504,522. Dated Sept. 5, 1893. This invention relates to an apparatns by which goods of any description may be hoisted from the hold of a vessel or other point and transferred laterally to any desired distance by the nse of a single hoisting rope with snitable gnide pnlleys and other connecting ropes, which allow the different movements to be made, and change of direction affected antomatically.

LOCOMOTIVE HEADLIGHT COVER.—Fred A. Stevens, Sacramento. No. 504,949. Dated Sept. 12, 1893. The object of this invention is to provide an easily-operated device by which the engineer can cover or nncover the headlight while standing npon a siding, or whenever desired. It consists of a hinged swinging cover and a pinion npon the hinge shaft, and a rack bar operated directly from the cab so as to open or close the cover.

SASH-HOLDER.—John H. Griswold, Oakland, Cal. No. 504,978. Dated September 12, 1893. This device consists of a plate secnred to the meeting rail of the lower sash, and having an nptnrned arm, hackwardly inclined, forming a space between itself and the opposing stile of the npper sash, which space is widest at the top and narrowest below. In this space is dropped a roller, the ends of which have small axles which are engaged by an inwardly projecting lever bifurcated over the nptnrned arm. By pressing down the lever the roller is raised into the wider portion of the space and the sashes are free to move. Bnt when the lever is at rest the roller will by any any attempt to move the sash be cramped down into the narrower portion of the space and will prevent movement.

PRACTICAL TREATISE ON HYDRAULIC MINING.

BY AUG. J. BOWIE, JR.

This new and important book is on the use and construction of Ditches, Flumes, Dams, Pipes, Flow of Water on Heavy Grades, methods of mining shallow and deep placers, history and development of mines, records of gold washing, mechanical appliances, snch as nozzles, hurdy-gurdys, rockers, undercurrents, etc.; also describes methods of blasting; tunnels and sluices; tailings and dumps; duty of miners' inch, etc. A very practical work for gold miners and users of water. Price, $5, post-paid. For Sale by DEWEY PUBLISHING CO., 220 Market St., San Francisco, Cal.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY AND LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T AND SALE.	SECRETARY.
Alpha M Co, Nev	60	25c	July 31,	Sept 4, Sept 25	E B Holmes, 309 Montgomery
Amador G Mine, Cal	1	5c	Sept 7,	Oct 12, Nov 7	F E Luty, 330 Pine
Arnold G and S M Co, Ariz	50	50c	Sept 19,	Oct 23, Nov 9	A Hadson, 320 Sansome
Bay State M & Dev Co, California	16	2c	Aug 26,	Sept 28, Oct 25	A J Coster, Plymouth, Cal
Belcher M Co, Nev	46	25c	July 31,	Sept 4, Sept 25	C L Perkins, Mills Bldg
Bodie Cons M Co, Cal	16	15c	July 24,	Sept 25, Oct 24	M E Willis, 309 Montgomery
Bodie Tunnel & M Co, Cal	17	10c	Sept 5,	Oct 7, Oct 24	Chas O Harvey, 309 Montgomery
Brunswick Cons G M Co, California	6	2c	Sept 4,	Oct 5, Oct 24	J Stadtfeld, 56 Nevada Block
Challar M Co, Nev	35	10c	July 31,	Sept 5, Sept 25	C E Elliott, 309 Montgomery
Clinton M Co, Cal	2	15c	Aug 9,	Sept 16, Oct 2	C E Gunn, Mills Bldg
Confidence S M Co, Nevada	23	25c	Aug 7,	Sept 11, Oct 2	A S Oroth, 414 California
Dora Gold Mining Co, Cal	1	5c	Aug 25,	Sept 25, Oct 25	Chas J Blumentnal, 415 Montgom'y
Eclipse M Co	5	2c	July 27,	Sept 4, Sept 25	O Tum Suden, 216 Bush
Evening Star M Co, Cal	10	1c	Aug 9,	Sept 12 Sept 30	J Scoville, 320 Sansome
Gray Eagle M Co, California	33	3c	July 10,	Sept 6, Oct 4	Chas O Harvey, 309 Montgomery
Herold M & M Co., California	5	1½c	Aug 10,	Sept 16, Oct 3	M E Willis, 309 Montgomery
Inyo Marble Co, Cal	21	5c	Aug 8,	Sept 12, Oct 12	W W Sargeant, Mills Bldg
Jackrabbit M Co, Cal	4	5c	Aug 10,	Sept 15, Oct 6	Thos Wetzel, 320 Sansome
Justice M Co, Nev	55	10c	July 31,	Sept 5, Sept 25	R E Kelly, 309 Montgomery
Martin White M Co, Nevada	29	25c	Aug 31,	Oct 26, Dec 14	K L Ross, 120 Sutter
Ophir M Co, Nev	60	25c	July 31,	Sept 4, Sept 25	E B Holmes, 309 Montgomery
Orleans M Co, Cal	13	$2	Aug 29,	Oct 9, Oct 31	Geo P Thurston, 575 Mission
Overman S M Co, Nevada	68	5c	Sept 1,	Oct 5, Oct 26	Geo D Edwards, 414 California
Potosi M Co, Nev	39	25c	Sept 11,	Oct 16, Nov 7	Chas E Elliott, 309 Montgomery
Seg Belcher and Mides Con M Co, Nev	12	10c	July 26,	Aug 23, Sept 18	E B Holmes, 309 Montgomery
Sierra Nevada S M Co, Nevada	105	20c	Aug 2,	Sept 6, Sept 25	E L Parker, 309 Montgomery
Siskiyou Cons Quicksilver M Co, Cal	7	1c	Aug 29,	Oct 5, Oct 27	Edw F Stone, 536 Pine
South Eureka M Co, Cal	5	1½c	Aug 2,	Sept 4, Sept 29	A Halsey, 318 Montgomery
Teresa M Co, Mex	11	10c	Aug 9,	Sept 11, Sept 27	K J Willats, 309 Market
Telrakoff S M & M Co, California	10	1c	Aug 18,	Sept 28, Oct 19	W J Gurnett, 308 Pine
Utah Cons M Co, Nevada	19	5c	Sept 1,	Oct 4, Oct 25	A W Havens, 309 Montgomery
Ventura Asphalt Co, Cal	1	50c	July 11,	Aug 28, Sept 18	F. A. Brooks, Montg'y Block
Waterloo G M Co, Cal	1	15c	Aug 2,	Sept 6, Sept 25	J M Bailey, 18 Post
Yellow Jacket M Co, Nev	55	25c	July 29,	Sept 5, Oct 9	W H Blanvelt, Mills Bldg

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE
Belle Isle M Co	Annual	J W Pew, 310 Pine	Sept 28

Cal. Debris Commission Notices.

NOTICE.—The California Debris Commissioo, duly appointed under the act of Congress of March 1, 1893, having received a petition from E. Below and others for permission to mine by the hydraulic process in the Polaris, Etna and Austral mines, situated in Goodwin Township, in Plumas county, California, and to deposit tailings behind a dam to be built in Hopkins' creek, gives notice to all concerned that a hearing will be held at the office of the Commissioo, Room 92 Flood Building, San Francisco, on October 10, 1893, at 1:30 P. M., On and before this hour and date, all parties interested may nle affidavits, plans and maps in support of their respective claims. By order of the Commissioo. W. H. Heuer, Major, Corps of Engineers, Secretary.

NOTICE.—The California Debris Commission, duly appointed under the Act of Congress of March 1, 1893, having received a petition from A. Steinberger for permission to mine by the hydraulic process in the Brandy City District, situate at Brandy City, Sierra County, California, and to deposit tailings in an old hydraulic pit, gives notice to all concerned that a hearing will be held at the office of the Commission, room 92, Flood Building, San Francisco, on October 10, 1893, at 1:30 o'clock P. M. On and before this hour and date, all parties interested may file affidavits, plans and maps in support of their respective claims.—By order of the Commission: W. H. Heuer, Major, Corps of Engineers, U. S. A., Secretary.

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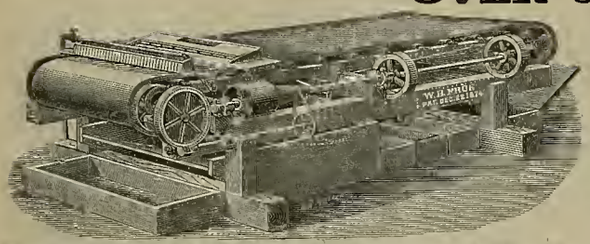

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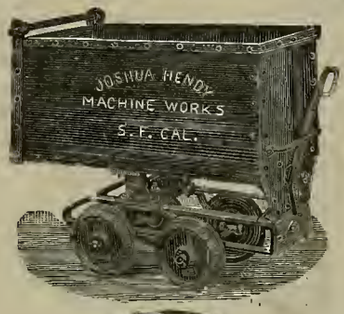

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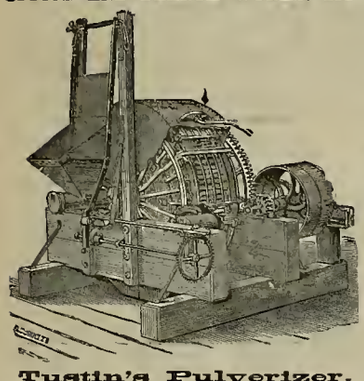

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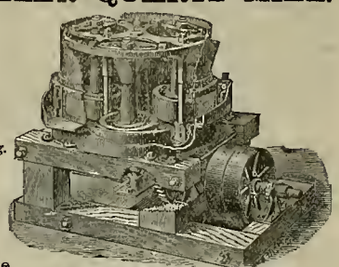

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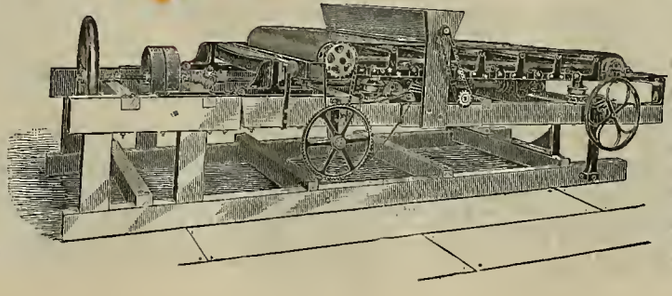

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VOLUME LXVII. Number 14. SAN FRANCISCO, SATURDAY, SEPTEMBER 30, 1893. Three Dollars per Annum. Single Copies, 10 Cents.

An Interesting Exhibit at the Fair.

In the Transportation Building of the exposition at Chicago there is an exhibit from San Francisco that attracts a great deal of attention. It is the original car and dummy used on the old Clay Street Hill railroad in 1873, with the tube containing the identical yokes, channel iron and rails used on that road, which was the first cable railway ever used, as far as known, in this part of the world. There is also a loan exhibit of grips, contributed hy various cable railway companies of the United States, and a number of other details in connection with the cable railway syatem, all being entered and exbihited by Mr. A. S. Hallidie of this city. It is the only exhibit of the kind at the exposition, and is the subject of much inqniry and interested comment by numbers of visitors.

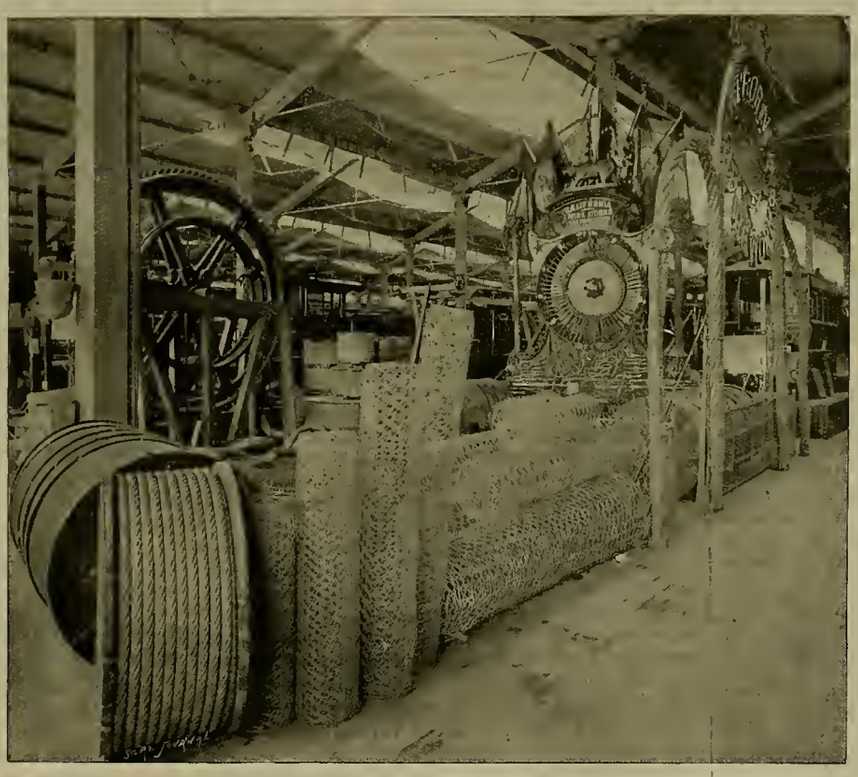
In the same space the California Wire Works have a very extensive and valuable exhibit of their manufactures. There are twenty coils of wire rope used for all kinds of purposes and especially for cable railways, a sample board twenty feet high hy sixteen feet wide having samples of all sizss and kinds of wire ropes and cables, flat and round, and seventy different kinds of knots and splices made by the workmen of the wire rope shop of the company. There are also samples of their other manufactnres, including wire nails, harb wire and wire of all kinds. The exhibit occupies a space of seventy feet hy twenty-two. The wire exhihit altogether represents very creditably the product of a manufactory that in its specialty —the manufacture of wire ropes for cable railways—leads the world.

A fair idea of the capacity of the works in this line may be ohtained from the letter of Supt. Wallis nnder "Foundry Notes" in this issue.

The company have been improving and perfecting their processes of manufacture for a number of years and recently erected a new steel plant for tempering steel wire for railway cables. All wire used hy tbe company undergoes tests as follows: The tensile strength and elongation are first ascertained by a nicely adjusted machine; then another machine determines the torsion, after which the wraps are ascertained by means of another apparatus. Before the wire is ntilized for a street railway cable it must sustain a tensile strain of 200,000 ponnds per square inch. The slongation must not he less than 2 per cent, and the torsion must he 45 twists in a lengtb of wire eqnal to 100 diameters. The wraps consist in bending the wirea complete turn on another wire of the same diameter, straightening it and bending it again with a complete turn in exactly the same place and straightening it out. All the tests must be made without fracture in the wire.

Another specialty of the company is the Hallidie ropeway. The same careful and thorough methods used in the manufacture of street cables are applied to the ropeways. Their high merit is amply attested by the fact that large numbers are in use.

The Hallidie and wire works exhibit at the fair have been suhjects of illustration by a number of Eastern journals. Among others, tbe *Street Railway Journal* (from which the accompanying cut is reproduced), the *Street Railway Gazette* and the *Engineering and Mining Journal* have given the exhihits commendatory notice.



CALIFORNIA WIRE WORKS AT THE CHICAGO FAIR.

The outlook in the Cœur d'Alene mining region is much hrighter than for some months. The improved aspect of things has been hrought about by two things, viz.: the rise in the value of lead, and the settlement of the labor troubles. Operations have been resumed at the Bunker Hill and Sullivan mines at Cœur d'Alene under the terms offered by the company—$3.50 per day for miners and $3 for car men and shovelers. One hundred men were employed Monday, and the force will be increased to 400. The Gem, Helena and Frisco mines at Gem will resume work within a few days, employing 300 men at the same wages. All the other mines in the Cœur d'Alenes are expected to resume under this arrangement, the Knights of Labor and the Miners' Union having sanctioned the action of the men in returning to work. Within a week over 1000 men recently idle will be at work.

The I. X. L. Mining and Milling Co. at Boulder, Colo., is making preparations for huilding a house of sufficient capacity to erect a 40-ton MacArthur-Forrest process, and 10 tons capacity will be put in at once. It is claimed that test rnns have heen made in Denver by the owners of the MacArthur-Forrest on I. X. L. mineral and 95 per cent of the prscious metal saved.

The Debris Commission has just made a trip to Brandy City, Sierra county, to inquire into the condition of the mine proposed to he worked by A. Steinberger. Two more applications are pending, and the prospect now is that a number more will soon be placed on file.

Cheap Milling Essential.

A local stock operator struck the key-note to the situation on the Comstock when he declared the other day: "Under the old plan the cry was, 'Can we strike a body of high-grade ore?' Now the proposition is, 'Can we get these low-grade ores out with a little margin of profit?'" That is it exactly. There has been little effort in the past to reduce the cost of milling ores to a minimum, and the general policy of the operators has apparently heen to stiffen the backbones of weakening stockholders with gilt-edged promises for the future rather than to demonstrate what could he done with tbe ore in sight. The new plan promises better things. And while the low-grade ore is being worked the hunt for higb-grade can go on just tbe same.

It is interesting in this connection to note that the Virginia *Chronicle* of recent date contained the following: "There are some points on the Comstock where ore of more than the average value is being extracted, and which are considered good prospects. The winze 20 odd feet down from the 1300 level of the Hale & Norcross persists in showing good ore, altbough it is some time since the ore was opened up, and somewhere between 40 and 50 carloads of ore, averaging according to car samples $35 per ton, have been mined. The hottom of this winze is an interesting spot that may speak for itself in the immediate future. Work to the eastward was started there recently for the purpose of putting in square sets, and important developments may follow at any time.

"Forty-dollar ore is being extracted from tbe west ledge ahove the 400 level of the Occidental. The value of tbis ore is all right; all that is needed is enough of it.

"Three hundred and forty-eight tons of ore, averaging per battery sample $19.91 per ton, were milled last week at the Nevada mill for the Potosi mine, and 210 tons, averaging per battery sample $22.50, were milled for the Savage. The Savage shipped 7400 pounds of crude hullion to the Mint at Carson. The Con. Virginia had $13,000 on hand at the close of the week. The Kentuck shipped gold bullion to the Mint to the value of $3239. This constitutes the production of the Comstock for tbe past week, and, if nothing else, shows that there is still ore in the mines and that there are still possibilities for the discovery of a large hody."

The Grass Valley *Union* on September 24th published a complete and accurate review of the Grass Valley mining industry. It was ascertained, among other things, that the dividend-paying mines—the Idaho-Maryland, the Empire, North Star, Omaha and W. Y. O. D.—are in hetter shape than at any time for five years, and others bid fair to contribute much to the wealth and fame of the district.

The President has nominated R. E. Preston as Director of the Mint, vice E. O. Lsech, resigned. Mr. Preston has been acting director.

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San Francisco, September 30, 1893.

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SOME YEARS AGO Judge Sawyer declared hydraulic mining a "great and intolerable nuisance," and there was rejoicing in some parts of the State that the nuisance had been abated. But some way the enthusiasm with which the decision was received has died out, and the predictions of enduring benefit to the industries of the State which followed it have turned out to be a trifle awry. The volume of the virgin products of the State has been restricted for ten years somewhere in the neighborhood of $100,000,000, at the rate of $10,000,000 per year, the common estimate. The anti-debris people have apparently not been able to raise enough additional grain, fruit, wool, hops, hides or vegetables to compensate for the loss. All their interests affected by the debris fight are not half as valuable as one year's output of these idle mines. In the midst of hard times the State is able to realize the situation very keenly. Public opinion now cordially indorses any reasonable effort to restore the great and intolerable nuisance to its former position of vigor and value.

THE wage question on the Comstock seems somewhat nearer settlement. The Gold Hill Miners' Union, which recently decided to reduce by a narrow majority, on Wednesday re-voted, with the result that 107 declared for $3.50 per day and 37 for $4. The Mechanics' Union, by a vote of 74 to 19, has likewise agreed to accept a reduction of fifty cents. It cannot be doubted that the action of these organizations will seriously shake the determination of Comstock miners to resist reduction, and the question will probably be opened up again. Under all the circumstances, concession on the part of the miners seems to be inevitable. Guarantees have been given that fuel and water shall be cheaper and the cost of living reduced. More men will doubtless be employed, so that the condition of the miner will really be improved. It is to be hoped that an early adjudication of the difficulty will be reached.

IT is said to have been discovered that slag or waste that accumulates so rapidly about iron furnaces has valuable fertilizing qualities. Not long ago it was found that the waste material was especially rich in phosphates, and, if properly handled, would be a valuable plant food on almost any soil. This was found to be especially true of the slag formed from the ores used in making iron and steel by the basic process, in which lime is extensively employed. The ore contains a large percentage of phosphoric acid, which, after the action of the lime, forms a phosphate of great strength, and, when ground to a powder, is a splendid fertilizer without further treatment. The slag resulting from other processes is not so valuable, but most of the powder made so far is said to have produced excellent results.

The October Convention.

It is designed to make the forthcoming miners' convention, (October 9th) a representative gathering from all the mining districts of California; and to that end the various county organizations are especially solicited to name as delegates such persons as not only have the interests of their several counties at heart, but who will attend. It is true that the convention does not meet under the same serious conditions as on the two previous occasions; nevertheless there are a number of very important matters requiring their attention and their definite action. The larger the convention, and the more direct its deliberations and harmonious its conclusions, the more likely is it that an impression will be made upon Congress, which it is designed to influence in several matters of legislation. As the result, or partly as the result, of the former conventions, which were large and enthusiastic, we have the Caminetti law. The coming assembly can accomplish as much in this and in other directions. Large attendance is essential. A good plan in the past has been for county associations to name as part of their delegations mining men resident in San Francisco or vicinity who own and operate mines in their various localities. It might be desirable in some instances to try the same plan for the coming convention.

The matter of absorbing interest at past conventions has been the resumption of hydraulic mining. The chief object of the miners has secured embodiment in the Caminetti law, which is now in operation. There was a feeling among quartz miners, which manifested itself to a greater or less degree, that their interests had been overlooked. It is true that they were subordinated; but they need not and doubtless will not be in future. The October convention will address itself to consideration of several matters concerning quartz and drift mines as well as to various things pertaining to hydraulic mining. The Stewart mining bill must be considered. Notwithstanding the fact that Senator Stewart has been petitioned to change several features very objectionable to the miners of California, no modification has been made, or is proposed, so far as we know. It has been clearly pointed out to the Senator how seriously the bill threatens the interests of drift miners in limiting the area of patentable claims to an absurd minimum. It will prevent the running of bedrock tunnels to tap the bottom of ancient river beds under volcanic caps. Under rulings of the department no patent can be obtained to ground previous to the discovery of gold. Drift-mining ground must be worked out. Drift miners can scarcely be expected to work under these onerous conditions. They must expend thousands of dollars, and in many instances, traverse thousands of feet of ground by tunnel before pay gravel is reached. They do not want to spend money, time and energy on ground to which they have no patent. All this is familiar to California miners, but Senator Stewart has seemingly been so busy impeaching the President and laying parliamentary traps for his gold-bug adversaries that he has paid no attention.

The legislative committee of the State Miners' Association has under consideration now several propositions which it is getting in shape to present to the convention. All who have resolutions or other measures they wish to have considered should either send them to the legislative committee, or present them in writing for presentation to the convention.

To Cheapen Silver Values.

Representative Loud of this State has succeeded in getting through the House a resolution calling upon the Secretary of the Treasury for information as to his reasons for not carrying out the silver purchase law. The matter is certainly a proper subject for inquiry. During the past several months the silver purchases have averaged about 1,000,000 ounces less per month than the 4,500,000 required to be purchased by the Sherman law.

The reason given by the Secretary and the mint authorities for failure to comply with the law has been that the price of silver is fixed in London and that various offers of silver to the mint have been out of conformity to its value thus fixed. But this is believed by friends of silver to be only a pretext, and that recent practices have been simply a part of the policy of the administration to ignore silver and depress silver values. An instance of the methods of the authorities is cited by a local paper: "A large dealer in the precious metals offered several thousand ounces of silver to the mint for $0.7625. The London quotation that morning, or its equivalent, was $0.7635. The silver was offered at the mint for ten mills less than this equivalent, and yet the authorities refused to accept it at this figure. They made an alternative offer of $0.75. This, of course, was refused, and the silver was sold in open market for $0.76. A statement of these facts was forwarded to Senator Perkins at Washington. He immediately sent the letter to Acting Director of the Mint Preston. The reply of that official contained a resume of the transaction and admitted the truth of all the statements pertaining to it. Director Preston concludes his letter by the statement that the department reserves to itself perfect freedom of action in the purchase of silver and the right to fix its price as it sees fit."

If the latter statement credited to the director is correct, it discloses an astonishing conception of his duty under the law. It is not the office of the mint to bear silver and "fix the price as it sees fit." It is to ascertain the normal market value and pay it. The public have a right to expect that the mint will do what it reasonably and legally can to sustain the value of one of its money metals.

The Comstock Situation.

A striking instance of the attitude of the investing public toward Comstock shares is found in the delinquent Exchequer sale which has just taken place. Sixty-six thousand shares out of a total of 100,0 00 were forfeited for non-payment of the last assessment of 10 cents per share. The stockholders had faithfully paid thirty-five assessments, but the majority were unable to stand the thirty-sixth, and forfeited. It is interesting to note that on September 21st Exchequer stock sold at 10 cents a share—just the amount of the assessment. The total assessments on the mine have aggregated a round $1,000,000. Exchequer is by no means an isolated instance of a refusal, or inability, of shareholders to stand a further drain. Recently 55,000 out of 108,000 shares of Alta Con. and 26,700 out of 112,000 shares of Hale & Norcross went into the treasuries of the companies.

It seems almost unnecessary to point out the moral or the train of events that has brought about this condition of things.

Of course the recent slump of silver had much to do with injuring confidence in the Comstock and interferred seriously with the plans of the various companies. It was the chief instrument which brought on the crisis in stock affairs. But the drift had long been in the direction of a revision of methods and withdrawal of the element of speculation from the conduct of the mines and the organization of the companies. It needed only some such agent as the break in silver to bring matters to a head.

The future of the Comstock is yet uncertain. It is too much to expect that a revision of present methods of stock manipulation, an honest effort to place the mines on a dividend-paying basis, and a reduction in the cost of mining and milling, will revivify the old lode and restore the "boom." But, under ordinary market conditions, it seems that there ought to be a profit in at least some of the mines. The ores generally contain a large percentage of gold. Many believe that the old lode is worked out. But it would probably be somewhat more correct to say that the old stock methods are worked out. It must be perfectly evident to the various companies that a change in their organization is necessary. They have given an indication of their appreciation of the state of things by reducing officers' salaries and office expenses. They are endeavoring to lower the cost of operation at the mines. It is said that measures are being devised for the cheapening of the cost of production in other ways. That these efforts may have a successful conclusion is the desire not only of the share-holding public but of all who know and care anything about the Comstock and its brilliant past.

A TUOLUMNE PAPER recently called attention to the disposition of miners in that vicinity to withhold information about the progress of their work or the real character of their strikes. The result is a letter from Julia Winchester, superintendent of Truths mine, Columbia, who acknowledges the justice of the criticism and writes a model letter containing full information about the development of her property. Says Miss (or Mrs.) Winchester, in addition: "All mining done conduces to the general good of the county. I believe in legitimate mining being carried on. I believe in the vast richness of gold and silver to be unearthed by right methods. And I shall be glad to do my part to point a true way to capitalists who are now holding back millions from investments because of distrust." This smacks of glittering generalities, but it shows the right spirit. The industry needs more Julias and more Truths.

THE Nevada *Herald* declares that there is a grand channel in the Washington ridge, and urges that drift mining be undertaken to develop it. It is said that there is room for a half-dozen good companies between the Harmony and the Central House. What the owners of claims in the unprospected belt ought to do is to combine and purchase a drilling outfit and bore holes enough to locate the channel, then development work could be made without so much uncertainty and at much less expense.

The Chilean Mining Exhibition.

Writing from Valparaiso to the *Chronicle* relative to the proposed international exhibition of mining machinery at Santiago Henry D. Woolfe says: The Chilean Congress has voted money for carrying out the project of having an exhibition of mining machinery, and the Government will pay the freight to and from any part of the United States to Santiago, reserving the right, however, to demand from the exhibitor the return of such outlay in the event of his exhibit being sold in Chile or elsewhere in South America.

The necessary buildings, now under construction, are located in a most picturesque portion of the city of Santiago. Power, either steam, electric or compressed air, will be furnished free to all exhibitors, while sufficient rock to illustrate in a practical manner the work of the various machines will be provided. It is proposed to open this display in April, 1894, continuing until June 30th.

In addition to mining machinery, electric appliances, wire rope and other motive apparatus used for mining purposes are admissible, while models of machinery and relief work showing improved methods of coal mining are particularly desired.

The most important section for San Francisco firms is the machinery department. Chilean mines are to-day using the most antiquated apparatus. With improved machinery the mines would surely be of immense value. Mine owners know nothing of American plants, beyond pictures seen in catalogues.

This exhibition will be of value not only to let Chileans see the most improved mining machinery, but that the visitors from Argentina, Peru, Bolivia, Ecuador, Uruguay and even Brazil will be impressed when they see that San Francisco can supply their needs. If the various foundries and machine shops will unite to make a good display their efforts will not be in vain. Any circulars or pamphlets describing the articles exhibited should be printed in Spanish. This is absolutely necessary.

It is to be hoped that San Francisco will be well represented at Santiago, as it is well known that German, English and French exhibitors have already applied for space, as well as several Eastern firms in Chicago and New York. Chileans to-day have the kindliest feelings toward the United States and will accord American exhibits the best possible treatment.

The Grass Valley Mines.

The Grass Valley mines have never attracted more attention at any time in their long and creditable history than at present. Development in the various old properties is going actively forward, and prospects and new mines are all said to give substantial promise of profitable returns. Much money is disbursed in Grass Valley by the operation of these mines, and, as a result, there is no more prosperous district in California. The *Union* makes an estimate of the number of men employed in the mines of the district and the amount of wages paid per day and the aggregate per month. The total is as follows:

Mine.	No. Employed.
Idaho (day's pay)	175
North Star (day's pay)	125
North Star (contract)	20
North Star (tribute)	20
Empire (day's pay)	80
Empire (tributers and contractors)	40
W. Y. O. D. (day's pay)	67
Omaha	70
Slate Ledge	15
Small mines (actual count)	107
Small prospects (actual number not known, about)	30
Total	750

The wages paid to each man employed will average at least $2.50 per day. This is a conservative estimate, for nearly all the miners in the district receive $3 per day, and "top" hands $3.50 to $5. As will be seen, a big margin is left for tributers and contractors. From this statement the following deductions may be drawn:

Seven hundred and fifty men employed at $2.50 per day means that $1875 goes into the homes of miners in the district every day.

Allowing 26 working days a month, the amount would foot up $48,750.

For the year the amount would foot up $585,000.

These are not "boom" figures, but a statement of the actual condition of things. This money is almost wholly spent at Grass Valley. The mines are the basis on which the town is built. As development increases in extent, there are larger and better things in store for Grass Valley.

KNOWLEDGE of the geology of the well-known Cripple Creek gold camp, Colorado, appears to be very obscure. A correspondent of the Denver *Mining Record* says: "Among the many thousands who have visited this camp it is barely possible there is some one who knows or has solved the enigma of how such things as exist here came to be, but of such the number is few. Locally, one says porphyry, trachyte and granite are the rocks, but in a circle or basin some 12 to 15 miles in circumference the country rock is generally termed porphyry and outside of that granite. The best of the mines here have been found in porphyry, which is a very fine-grained rock, feldspar being the base, associated with quartz and not unfrequently with minute crystals of iron pyrites, hence the name given it by Prof. Emmons of pyritiferous porphyry."

A New Fine-Gold Process.

The latest process for the separation of fine gold in placers comes from Montana, and is the invention of E. F. Dawes and Eelif Hanson of Missoula. It is a dry process and is designed especially for fields distant from sufficient water for other methods. It is described in a local paper as follows: "The ore or gravel is run through a crusher and a steam dryer, after which it is dumped into the hopper of the separator. Dropping from this it strikes a powerful blast of air, which carries it between two sets of slowly-revolving copper cylinders, coated with one-sixteenth of an inch of mercury. These cylinders are placed in two lines of three each, one above the other, so that the dust, driven by the air blast, passes between them in a wavelike line. The ore first strikes a cylinder similar to the others, but revolving in an opposite direction, which catches the coarser gold and the nuggets. Then passing between the other cylinders, all the gold is caught, however fine, and the waste is carried by the air-blast to a conveyor, which bears it away. The mercury on the cylinders is constantly renewed so that a fresh surface is always presented."

It is claimed that the process has been given a practical test that has demonstrated its adaptability to this class of work, and its success is assured. Mr. Dawes has been at work upon the scheme for several years and he and Mr. Hanson have just perfected a separator that works satisfactorily. Six men can handle a large amount of gravel with the process.

A PROMINENT CITIZEN of the State of Washington—Col. L. S. Howlett, of North Yakima—has suggested in the public prints that employment might be found for many unemployed men by grubstaking, and he asks the business men of the cities to furnish the means. The Cœur d'Alene mines were discovered by grubstaked miners. Senator Taber, of Colorado, made his fortune in this manner. And numerous instances might be cited where the practice has proved profitable to miner and capitalist. The recent influx of large numbers of Colorado and Nevada miners into this State suggests that the same method might well be employed more extensively here. The miners, as a rule, are deserving men and experienced prospectors. For an outfit they want principally bacon, flour, sugar, etc., and blankets, if they have none. The cost is small. The results may be very great.

A COLORADO paper tells how several properties at Raven Hill are being worked with plows and scrapers: Spread over the surface is a bed of decomposed quartz and porphyry seven or eight feet in depth, which is rich enough to bear transportation to water and yield a profit by sluicing. A foot or so of soil on top of the pay gravel has to be removed and this can best be done with plow and scraper. Running through this highland placer deposit is a quartz ledge from 10 to 12 feet in width on which a shaft, now down about 20 feet, is being sunk. The major part of this ledge is a brown iron-stained quartz with streaks of crystallized quartz running through it, in which many specks of free gold are visible. The decomposed matter found in the seams yields gold in panning. There is also quite a showing of what some persons, claiming to know pronounce green tellurium. It has not been tested.

C. B. DUGAN, of this city, an old miner, has recently returned from a two and one-half years' prospecting tour in Peru and Ecuador, South America. Mr. Dugan spent much time in the Sierra del Pasco region, Peru. He devoted himself largely to the investigation of placers, and found in the channels of streams deposits that he is satisfied will yield from $40 to $50 gold per ton if a satisfactory process of separation can be found. The trouble is that the gold is much laminated and sluices fail to perform their office. The native methods are crude and unsatisfactory, but nevertheless the natives are able to make several dollars a day. Mr. Dugan thinks that he may be able to devise some scheme of amalgamation with copper plates that will be profitable.

THE Butte and Boise railroad has been projected to run from Butte, Mont., to Boise, and the route already surveyed passes through Gibbonsville. That this road will be completed in the near future is probable from the fact that it will open up an extensive gold-mining region yet hardly touched.

Slickens.

IT is claimed that rich gold deposits have been discovered in the Alberni district, British Columbia.

THE Nevada City *Herald*, in a self-congratulatory mood, declares that there are "no free soup kitchens in town."

THE result of crushing of ore from the croppings of the Black Bear mine in Rough and Ready township, Nevada county was $4.50 per ton.

THE old Pinacate placers in San Diego county, and near the San Bernardino border, are being reworked with excellent results. Dry washers are used.

EN BALLOU, of South Fork, Shasta county, is said by local papers to have devised a process that successfully works ore up to 95 per cent of its assay value.

NOW that its lawsuit has been decided in favor of the Justice Mining Company, arrangements are being made to resume work in the gold-bearing ledge at an early day.

THE Humboldt *Times* claims that over $600,000 in gold was taken from the Klamath, Trinity river and Willow creek mines, in Humboldt county, during the past year.

MR. GEORGE P. THURSTON, of San Francisco, has been elected superintendent of the Orleans mine, Grass Valley. Active work in developing the mine will be the order of things.

THE Gold Flat Mining Company has leased the mill of the Nevada County Mine at Nevada City. It is expected that the mill will be kept running most of the time on ore from the Gold Flat.

THE Centennial gravel mine, on the Washington road, Nevada county, has been started. The owners, all Virginia City people, have put up sufficient coin to work it, until, they say, they strike rich gravel.

THERE will be a meeting of the Yuba County Miners' Association at Smartsville on Monday, October 2d, at 8 P. M., to elect officers and choose delegates to attend the annual convention of the California Miners' Association.

THE Colombian Gold Mining Company and the Sacramento County Irrigation Company have incorporated, each with a capital of $1,000,000, fully subscribed. Directors of each—J. A. Merrill, A. R. Dow, D. R. Thomas, R. W. Button, W. B. Thomas.

T. F. WALSH, of Leadville, half-owner of a smelting plant at Kokomo, Colorado, and J. W. Benson of Denver, who contemplate building a smelter in the San Juan, state that by a new process they can treat $5 silver ore at a profit. The method is not given.

THE Calumet and Hecla Mining Company has declared a dividend of $5 per share, or $500,000, payable on September 27th. This is the largest dividend paid by any mine in the world. The Calumet is a copper mine, and the price of that metal has recently been down to 9½c per lb, the lowest in many years.

ON the recent trip of the Federal Debris Commission and State Commissioner Kidder to Brandy City, Sierra county, the team hauling the Commissioners ran away and a serious accident was narrowly averted. As it was, Commissioner Kidder escaped with a broken collar bone. His companions were not seriously hort.

THERE has been a change in the superintendency of the Evening Star mine, Nevada county, George A. Taylor having retired as superintendent, and Mr. Peet of San Jose socceeding him. During Mr. Taylor's management of the mine he has been active and economical, and had gathered around him a competent set of miners.

THE Veta Madre Mining Company has incorporated in San Francisco. Directors—G. M. Foote, F. E. Luty, T. E. Jewell, John Henderson, W. B. Murdoch, S. L. Theller and Sylvester Gardner. The capital stock is $400,000, in shares of $2 each, all fully subscribed; 190,300 shares are held by Sylvester Gardner as trustee of an estate.

SOME miscreant blew up 600 feet of flume belonging to the South Yuba Water Company near Quaker Hill, Nevada county, at three o'clock Tuesday morning. This cots off the water supply of Grass Valley and its big mines. In consequence most of the mines will have to remain idle for about five days, as there will only be water enough to run the pumps.

J. B. Low, W. S. Lyle and P. Kervin have returned from their visit to Vanderhilt district. While there they made a careful examination of the Gold Bar and other claims in the district, in which John W. Mackay, James L. Flood, W. S. Lyle and G. R. Wells are interested. They decline for the present to make public the result of their investigations.

THE promoters who arranged the casting of the Montana silver statue of Liberty in the Mining Building at the Columbian Exposition announce that they will take the statue to the Midwinter Fair to exhibit if space is allotted. This is the statue for which Ada Rehan posed and over which there was such a controversy as to which one of several well-known theatrical stars was really asked to pose as the model.

THE Quincy Mining and Water Company, which recently bought the property of the Plumas Mining and Water Company, in Plumas county, and which intended to inaugurate mining operations on a large scale, has been enjoined by F. C. Terry, an adverse claimant of a part of the property. The *National-Bulletin* says the community is very indignant over Mr. Terry's action, which is without warrant.

DR. ALEX. TRIPPLE has been appointed superintendent of the Phœnix mine at Cave creek, Ariz. This mine with its mill of 100 stamps, will be one of the largest in the West. The doctor was for many years general manager of the Globe mine and was the first superintendent to bring this property into prominence, and to establish its reputation as a big payer of dividends and one of the largest producers of copper in Arizona.

SOUTH AFRICAN papers note the arrival at Cape Town, August 16th, of John Hays Hammond, the well-known California mining engineer, who has gone to the Witwatersrand under engagement to the big Barnato Brothers' syndicate, as expert adviser on the properties with which their house is connected. Mr. Hammond is accompanied by V. M. Clement, mine manager, and S. B. Connor, a leading millwright, both gentlemen

of Mr. Hammond's own selection in the States. Gossip assigns to Mr. Hammond the biggest salary yet paid to any one in South Africa, said by one authority to bs as much as $30,000 for ths term of his sngagement, which will not bs more than seven or eight months. His mission thsre is to organize the properties of the Barnato syndicate, and introdoce in their operation such California mining practice as is adaptsble to the Rand. Mr. Hammond will return here next year.

A special from Bonham, Texas, says: A syndicate, includ-ing prominent men of Texas, Colorado, Missouri aod Ksusas, is being formed to coin dollars into hexagon shape, at the rate of $100,000 dollars per month or more, if the legislatores of these States will declare such coio legal tender. It is claimed that no individual or corporation is prohibited from coining silver into standard dollars provided the shape of such coins is not the same as of the coins issued by the United States Government.

The August cleanup at ths Treadwell mine, Alaska, is as follows: Shipment of bullion, $82,297; tons of ore milled, 20,-691; tons of sulphurets treated, about 400. Of bullion, there came from eolphurets $24.759; estimated gross expenses for psriod heve been $23,541. Note.—The estimated profit of over $58,000 is considerably larger than for any previous month in ths history of the mine. The superintendent attributes the iocreased yield for the month partly to the fact of increased amount of ors having been mined from the 110-foot level, which is the despest portion of the workings.

What, according to one expert, is "the greatest mining invention of the age," hes recently, it is said, been successfully tested in the deep Pennsylvanian anthracite coal mines. It is an apparatus to enable rescuers to enter a colliery immediately after en explosion without fesling ill effects. It consists of "an air-bag, an appliance to hold the nose shut, and a hattery and a small incandescent lamp." The air-bag is of canvas, and is worn on the back and fastened under the arm. Air is inhaled by the mouth from this bag by means of a rubber-tube connection. The hattery is strapped about the person and the lamp is pinned to the coat.

Mines in the noteó silver camp of Creede, Colo., are again being worked, but with reduced force aod reduced wages—$2 and $2.50 against $3 and $3.50 per day formerly. In all instances where the resumption has occurred it has been on agreement between workmen and mine owners that as eoon as the price of silver goes up the wages ars to be restored. In all the mines the ore being stoped is of the lower grade ressrves, this being calculated not only to give more men work in its outputting and handling, but it also keeps the smelter etacks in blast without msking any considerable increase in the supply of silver or rendering mine owners liable to considerable loss, as shipping high-grade ore would.

John D. Beam, an sggrieved stockholder in the Waterloo Mining Company, locsted in Madera county, has brought suit to declare an assessment of 15 cents a share on the capital stock null and void. The defendants are the corporation and J. M. Bailey, Belinda S. Bailey, Jobn Doe and Jane Doe comprisiog the bosrd of directors. Beam charges that the assessment was levied without causs in pursuance of a conspiracy between the defendants, having for its object to defraud him (Beem) of his etock. The directors are alleged to have known that Beam could not psy the assessment. He owned 35,000 shares of stock, which would heve made his total assessment $5270. Beam says that the sole object of the assessment was to "freeze" him out of the company.

We are in receipt of a copy of The Coal and Metal Miners' Pocket Book, published by The Colliery Engineer Company of Scranton, Ps. It is a handsome volume of nearly 600 pages, containing in a brief and simple form information, rules and tables on all subjects connected with either coal or mstal mining. It is boond in flexible morocco with pocket and flap and is printed with new typs on fine light paper. All departments are illustrated with drawings and cots so as to make the text as clear as possible. It is an invaluabls book for mine-owners, eupsrintendents, foremen, mining engineers, mins mechanics, or mining students. It is sold for $2.75 in flexibls morocco, and $2.00 in cloth. It can be secured at thess prices, postage prepaid, from Ths Colliery Eugineer Company, Scranton, Pa.

Foundry Notes.

The Fulton Iron Worke are constructing a ten-stamp gold-mill for Prescott, Arizona. It will bs shipped next week.

Bids have been opened at Washington for ths construction of a boiler-house and laundry building at the Marine Hospital in Sen Francisco. The lowest hidders were C. Green & Co. of Chicago, at $6479.

The battle-ship Oregon will leave the stocks of the Union Iron Works Octobsr 26th. Ths christening will bs performed by Miss Daisy Ainsworth, daughter of Capt. J. C. Ainsworth. She is a native daughter of Oregon.

The Vulcan Iron Works have just furnished two Bruckner furneces to ths Germania Lead Works in Utah, owned largely in Sen Francisco. The furnace cylinders are each 102 inches in diameter, 22 feet long, and capable of receiving 12-ton charges. The cylinders each weigh 23 tons and will add largely to the reduction capacity of ths works.

The following self-explanatory communication has been received from Mr. George H. Wallis, superintendent of the California Wire Works: "In your issue of Sept. 23d, page 203, it is stated that ons of the largest steel cshles on record was completed by the Globe Works, Liverpool, England, heing 3⅜ inches in circumferencs, 4½ miles long, msde of 42 wires, and weighing 25 tons. We beg to say that we have made a number of steel wirs cables much larger than the above, and that during the psst tbree years we have maoufactured four steel cables, eech 5 4-10 miles long, four inches in circumfersuce, weight 35 tons each, and numerous other csbles, probably 20, from four to fivs miles long, each four inches in circumference and weighing from 28 to 32 tons; and tbat we have now orders on hand for ons cable six miles long, 4½ inches in circumference, weight 42 tons, four csbles 5½ milss, and ten cables from 2½ to 4½ miles each. Moreovsr, all of our cables are made with 114 wires, as against 42 of ths ooe refsrred to in your valuable journal of Sept. 23d, and consequently cootain nearly three times the length of wire per mile. We have recently enlarged our steel tempering plaot to a capacity of 300 tons per month, and are not afraid to tackle any size order for steel cahles, and will goerantee, under forfeiture, that they will he superior to that English cahle." There is no doubt that the works cen do just what Mr. Wallis says.

The Union Iron Works have just shipped to Sierra county an nnusually heavy amount of machinery for a 20-stamp mill of the Mount Maria mine, American Hill, J. R. McIntosh superintendent. The stamps each weigh 1200 pounds, and the shoes are 9½ inches in diameter. 8 inches high; dies 9½ diamster by 7½ inches high. The outfit consiets of e 5x12 grizzly, 10x16 crusher, four ore-bin gates, four Challenge ore-feeders, 20 stamps, one traveling crab, 242 square feet of copper plate with two-ounce plating, one amelgam barrel, one wash tank, one gold retort, one 16-foot water-wheel, one water heater, wooden tanks, four Woodbury concsntrators; total weight of machinery, 140,000 pounds. The main shafting will be driven by low transmission from the water-wheel. Seventy-horse power will run the mill. Ths unnsual size and weight of the stamps are worthy of note. It is expected that they will develop a crushing capecity of six tons per 24 hours, with a drop of 95 to 100 per minute; and, if so, it is probable that they will be generally introduced in the mills of ths State. The rock-crusher is a Union-Blake's end weighs 14,000 pounds.

A Vulcan Wire Ropeway is now being erected at San Andreas de la Sierra mine Durango, Mexico, having been mads at and forwarded from the works in this city. The ropewsv ie 15,517 feet long, having one span of 1850 feet, and with a fall of 4100 feet for its entire length. In this connection it is not inappropriate to ssy something concerning the uss of wire ropeways, and particularly of the Vulcan. Iu mining districts where ths country is very mountainous, the expense of tranesporting ore, cordwood, charcoal, etc., to the mills is oftan very great, owing to the rugged contour of the ground, steep grades, etc., etc. In soch ceses, the system of ropsway transportation offers many adventages for economical transportation of such materials. For example an instance may bs cited where the cost of cordwood delivered at the mill was about $12 per cord. A Vulcan ropeway 10,000 fest in length was erectsd, and the cost per cord was reduced to $3. It is estimated that the entire cost of putting in the ropeway was covered by the saving of the first seven months of operation. The Vulcen Iron Works have lately put in ropeways at Ventanas mine, Mexico, and at Clipper mine, Kennett, Shasta Co., Cal. A ropeway has also bsen erected at Pomeroy, Garfield Co., Wash., for the transportation of wheat in secks from a tableland down to the Snake river. Ths ropeway system is available for a variety of materials, such as ore, hroken rock or material of similar sizes which can be carried in bockets; cordwood, for which a speciel wood-cerrier is used; wheat, charcoal or other materiel in secks, etc., et c In ceses where the ropeway is constructed on a grade, so that the difference in elevation of terminals is equivalent to a grade of one in seven, the ropeway will run by gravity, the carriers descending on one side and sending up the empty buckets or carriers on the other sids. Where the grade is not sufficisnt to develop power enough to make the ropeway self-operative, or is in a level country, some auxiliary power can be employed for operatiou. The power is connected with the ropeway by means of gearing attached to the end terminal.

Mining and Civilization.

NUMBER II.

In the remarks under the above head, Sept. 16, reference was more particularly made to the influence of the products of the mine. We come now to consider the position and influence of the miner himself. The world admires courage and perseverance wherever these qualities appear. It especially honors those who risk life and limb in the brutal "turmoil of battle;" but it considers too little the courage so often displayed in the ordinary and useful walks of life.

What greater evidence of true courage and commendable perseverance can be shown than is presented by the miner as he cuts his way through "stubborn rock or treacherous sands" in search of the metals, precious and useful, so needful to art and civilization? In his battles to win the object of his search, he often encounters more dread and more insidious dangers than the soldier who faces the serried raoks of an approaching foe. Where on the wide world's surface can be found such monuments of true courage and useful labor as are presented in the hundreds of miles of tnnoels aod shafts that have been bored into and through the mountains of California, to say nothing of ditches and flumes which traverse every hill and canyon from the snowy peaks of the Sierras to the sunny plains at their base? Where can be found the soldiers who have faced more dangers or suffered greater decimation than miners throughout the world who delve in the bowels of the earth for the coal, without which civilization and commercial enterprise would come to a standstill?

These tunnels, these shafts and these artificial waterways are the monumeots which will perpetuate the memory of the thousands of miners who have delved and perished in the work of producing the precious metals which have made modern progress and civilization possible, and furnished the means by which the machinery of the world's manufactures and commerce ls kept in motion to provide the necessaries aod comforts of the dwellers on the earth, whether rich or poor.

The miners are the motive power by which the world moves. Although they "delve in the dark, damp drifts" of the lower earth, they are *men* in the highest sense of the word—men who should exert far more influence and fill much more prominent positions in the "body politlc" than they do.

It is gratifying to observe that they are already beginning to assume the dignity and importance düe to their services. Their voices are already heard in the halls of our National Legislature, combating the schemes and plans which have been so cunningly devised to deprive *them* of their just rights, and to place the great general labor interests of the country at a disadvantage and in the power of the stock-jobbers and manipulators of the money rings of Wall street. As was remarked under another head in last week's issue: "The drift of legislation and judicial decision has, of recent years, been uniformly against the miner, but he has now the spirit aod strength to stem the tide and to turn the current in his own direction."

Mining has become a leadiog branch of American industry, second only to that of agriculture. To-day no broader field to wealth and honor lies open to our young men than the husiness of mining and scientific metallurgy. Time was, and but a few years ago, when there was a great lack of men properly educated for this business. It was a new branch of industry to our people on both sides of the continent; but now we have reasonable facilities in the way of mining schools and mining experts at practical work, where young men may acquire a thorough knowledge in every department of mining and metallurgy.

Every miner who is ambitious to advance in his profession should observe and study whatever pertains to the practice and science of mining. In no other way can he hope for preferment. The science of miniog is exceedingly broad in its scope. The miner should have a practical knowledge of geology. Surveying is a very important acquirement. Chemistry is a science most intimately associated with mining in various ways. Mechanics is another science without which oo one can become proficient in any departmeot of mining. It is not necessary that miners should become expert in all these branches; but it is important that they should adopt habits of close observation and read and study intelligently in all these departments of knowledge. The miner who will thus apply himself will most assuredly pave the way for, and ultimately reach, such advancement in his profession as will lead to independence, fortune aod honor.

We need more educated men in this profession to the end that they may feel sufficient interest in themselves and their calling to assume the dignity and position appropriate to their employment, and be ready and able to assert and protect their rights against all assailants.

Beiog a leading industry, and in the direct march of civilization and progress, it should he the policy of our Government to encourage, by every reasonable means, the further development of mining. The business should have its own advocates, and be able by its own men to direct popular attention to the matter of its needs and to the immense wealth that still lies hidden in the bosom of the earth waitiog only for the hands of labor to draw it forth.

California possesses a combination of natural resources and opportunities fouod nowhere else oo earth. With a soil of exuberaot richness; with a climate semi-tropical in character; with unmeasurable water-power, which, by electrical appliances, can be brought to every town and hamlet; with mines of inexhaustible richness; and standing upon the western border of civilization, and looking over upon and commanding the growing commerce of the magnificent East—how can we calculate the possibilities before us? Can such advantages with proper effort fail to crown our early future with a wealth before which ancient oriental affluence must surely pale?

James D. Hague, principal owner of the North Star mine, has bougbt the Rocky Bar mine, Nevada county, one of the oldest and best properties in Grass Valley district. Mr. Hague has owned the New York Hill, tbe adjacent property, for some time, and it will probably be worked through the Rocky Ber. Negotiations are also pendiog and whicb will probably result in the Stockbridge, the Messachusetts Hill, the Ford & Reilly and the Great Britain claime passing uoder tbe control of Mr. Hague. The Rocky Bar was sold by Wm. Watt to the recent owoers some years ago for $22,000. Since that time a great deal of development work has beeu done and the mine has yielded handsomely. The shaft is down 700 feet, but of late years no work has been done below the drain tunnel, and what hae been done has been mostly by tributere. The new company has formed witb the following as directors: Jas. D. Hague, E. R. Abadie, Ches. E. Clinch, Fred Searls and Thomae Marshall. The directors orgaoized by electing Mr. Hague, president; Fred Searls, vice-president; Thomas Marshall, treasurer.

Much interest in the approaching conventioo of the Minere' Association ie taken throughout the mining counties. The various local organizatione are prepariog to elect delegatee, or have already elected them, and discussion as to the purposes of the convention is going on in local papers. Altogether the outlook for a large attendance and a very interesting and important session is excellent.

Studies in Gold-Milling.

NUMBER III.

Written for the MINING AND SCIENTIFIC PRESS by J. A. EDMAN.]

Instances are frequent where silica appears as a coating on the gold and preventing its amalgamation, but almost exclusively in treating highly decomposed and oxidized ores. The silica is not here the fragments of hard quartz from the matrix, but appears to be films of amorphous hydrated silica, generally almost transparent and deposited from solutions percolating through the ore; and the gold affected, often appearing as films, delicate filaments and arborescent forms, can probably be referred to the same agencies, namely, precipitations from solutions originating in the lodes or their wall rocks. Such silica films have been found on the hard and often nodular masses of pyritous quartz surrounded by soft and friable vein matter, and also in microscopic fissures in the wall rocks of such lodes, together with limonites and occasional coatings and druses of crystalline quartz. In fact, much of the difficulty in milling decomposed ores is due to the presence of gelatinous silica, which increases the density and thickness of the pulp resulting from the suspended clayey matter already present, and which cannot be counteracted by chemical means in the large stream of water issuing from a battery of stamps, but which can, to great extent, be remedied in grinders, such as arrastres and pans. Too much stress cannot be laid upon the already abundant evidence, fully proven by the writer's experience, that the presence of hydrous oxides of all kinds, as well as of silica in that condition, presents most serious difficulties in the treatment both of gold and silver ores by amalgamation, the action set up in the pulp by such minerals being both mechanical and chemical in its nature and so far but little investigated. Where such ores can be economically dehydrated, as by a calcination previous to crushing, a great improvement in their yield of metal becomes immediately apparent, and the nature of the pulp quite different from that of the original ore.

In support of this theory and in contrast with the experience gained in some of the large lodes of decomposed ores constantly permeated by moisture and so often met with in California, and which, from the above-stated reasons, generally have proven disastrous failures, may be cited the case of a series of gold-bearing veins, to great extent made up of oxidation products and a variety of altered minerals probably originating under nearly the same conditions, now prevailing in the mountains of California, but where long ago such action ceased and nature for ages has entered upon a dehydrating process by denying the prime element of chemical changes, namely, abundant moisture. This is strikingly illustrated in the celebrated Harqua Hala mine of Arizona, notable not only for its generally high-grade ores, but for the facility with which its very much diffused gold can be saved by ordinary battery and plate amalgamation, and this, in spite of the fact that owing to the scarcity of water the supply for the battery has to be used over again after being settled in reservoirs. In this mine much of the gold is microscopic in size and the heavy mineral wulfenite is present in large quantities. Although concentrators are used, their products contain but little free gold or amalgam and the tailings are very poor. The explanation is found in the fact that the gold particles are very bright and free from coatings, and that the ores, although mainly made up of earthy and metallic oxides, have become almost anhydrous, and are likely to remain so, no water or even moisture being found in the deepest workings of that mine.*

In attempting an inquiry into the condition in which gold exists in the associated minerals of gold-bearing lodes, such as the sulphides, arsenides and antimonides, and to solve the question whether the gold therein is metallic, or chemically combined, there is little authentic information to guide the investigator. The microscope so far has shown the forms under which metallic gold occurs in these minerals, and its evidence points strongly to the probability of chemical combinations both in pyrites and in arsenides, from the form, aggregation and condition of the gold visible in the oxidation products of these minerals. It is in evidence that gold-bearing pyrites have, within limited zones, been bodily leached out, leaving empty cavities retaining the shapes of the cubes, while in but few instances a silicious skeleton, alone or supporting gold in minute filaments, remains behind. Minute crystals and delicate wire gold are frequently noted among decomposing arsenical pyrites and antimonial sulphides. On the contrary, instances are quite rare of the leaching out of metallic gold from hard or even moderately compact quartz while in place. In the same lodes, where a leaching action is patent, evidences are also abundant of metallic gold having been deposited from solutions, together with and in the midst of other products of leaching, such as limonites, xanthosiderites, gothites, limnites and many manganese-copper and lead-bearing oxides, and this coupled with the admitted solubility of gold sulphide in alkaline sulphides, gives indirect evidence of its occurrence in some combinations more easily soluble than metallic gold.

The minerals distinctly traced and noted both in bulk and under the microscope, and in which chemical combinations cannot be doubted, are the tellurides and selenides of gold and silver; but this fact is frequently lost sight of by miners and millmen of this coast, who have had but little knowledge of and less benefit from the experience gained by the miners of Colorado in the treatment of their very rich tellurides. The available literature on the occurrence and treatment of these ores is very scant, even late text books on the metallurgy of gold almost ignoring the subject, while their successful metallurgical treatment is confined to the smelting works of Colorado.

Although the various gold-bearing tellurides have long been found in California from Mariposa northward to Plumas and to Shasta counties, but little reliable information on the subject can be had except the meager data in the older reports of the State Mineralogist. Their occurrence, therefore, has been considered exceptional, and their study has been neglected. Of the gold-bearing selenides still less mention has been made, and they are scarcely known to the gold-miner. There is no doubt but that closer and more extended examination of concentrates and ores will develop their existence in many mines often where least suspected, and the waste of much valuable mineral may then be prevented. Wherever concentrates are exceptionally rich, their presence may be expected, and microscopical examination of the raw or roasted concentrations has often proven the presence of one or both of the above-mentioned gold minerals, often of exceeding value.

Exceptional facilities for studying selenides have been afforded the writer when treating the ores of the Diadem mine, of Plumas county, Cal., which is situated on a large lode of very decomposed vein matter, and generally furnishes striking illustrations of various progressive changes by infiltration, oxidation and deposition. Here in a certain zone, marked by the occurrence of large bodies of dolomite, and at a depth of 300 feet, the selenide of gold and silver is found, associated with the selenides of copper and of lead.

The characteristics of the pure selenide of gold and silver are as follows: Color, bluish-black to black; lustre, metallic, splendent on some faces of crystals; isometric; cleavage cubic, perfect; generally found granular and in crusts. Specific gravity, 8 to 8.5; hardness, 2.5. Composition, (approximately), selenium, 64 per cent; gold, 32 per cent; silver, 4 per cent. Before blowpipe, melts easily on charcoal to a black globule, evolving fumes of selenium; with soda gives first a grayish yellow, then a bright gold-colored bead, which is brittle and nearly silver—white internally; after long refining with soda and borax a malleable gold bead is obtained.

As the pure mineral is found in very small quantities, the specific gravity and composition have as yet not been accurately determined.

The selenide of gold is here always found associated with metallic gold, grains and films of which are occasionally found penetrating the minute cubes of the mineral. The rich ores consist of white granular or yellowish gray banded and sugary quartz, often honeycombed, in which the selenide occurs in small black grains or gray blotches and stains in the quartz, often extremely diffused and then showing under the microscope as minute black filaments. The richest ores, sparingly occurring, are dark gray, show some metallic gold, and give by assays up to $10 per pound. In the average ores below $100 per ton, the selenide is seldom visible, but appears in the concentrates as small black cubes, quite a variety of pyrites and grains of wulfenite always accompanying such ores.

The selenide of gold and silver, as above noted, can only with difficulty be distinguished from many other abundant minerals. Where manganese oxides are present and stain the ore, the selenide can only be recognized by fire test, the more so as the encrusted selenides often contain a large percentage of manganese compounds, such as Psilomelane and Wad. The selenides of lead and of copper resemble it closely, and when granular it may easily be taken for galena, the crystal form and cleavage being identical. The rich ores of black tellurium also resemble it.

The following simple test will often suffice to distingulsh the richer selenide ores from those resembling them externally, except from the tellurides. The hard ore, broken into pieces of one-half to one inch in size, should be placed in a sand crucible and moderately heated. A little nitrate of potash should then be sprinkled upon it so as to reach most of the ore, after which the crucible should be kept at a red heat for nearly half an hour, while only loosely covered to prevent coal from dropping into it. After gradual cooling, gold in globules, often quite minute, will be found on the glazed surface of the ore, if selenide of gold is present. If the mineral is much diffused in the ore, it may be necessary to heat the sample for an hour and apply more nitrate. Blowpipe trials on small fragments will give the same result with soda, but a long-continued heat is needed to reduce the gold to a metallic state.

In view of these considerations and the fact previously stated, that the free gold in selenide ores cannot be recovered by ordinary amalgamation, it becomes apparent that such ores cannot be profitably treated, except by smelting. Even with low-grade ores where smelting could scarcely be practicable, and crushing with careful concentration must be resorted to, a great loss cannot be avoided both from the friability of the mineral and its extreme diffusion. After such treatment the concentrates should be smelted. For very rich ores (from $1 to $20 per lb.) crucible smelting on a small scale with lead or litharge and soda may be used to advantage, with cupellation of the rich lead resulting.

The selenide of copper found at the Diadem mine in association with the gold mineral, is deep black in color, moderately lustrous, generally in irregular grains or imperfectly crystalline, and is often coated by a leek-green translucent mineral. It often contains enclosed grains and scales of metallic copper. The selenide of lead is rare; it resembles clausthalite, but is generally found decomposed into a yellowish gray ochre.

It is an interesting fact that all the occurrences of gold-bearing selenides noted by the writer, as well as most of the valuable telluride ores exploited in California, have been found in conjunction with lime-bearing rocks, chiefly calcite and dolomite, which peculiarity should not be lost sight of in further explorations for these valuable but much neglected ores.

*The writer is under obligation to one of the former owners of the Harqua Hala mine, Mr. A. G. Hubbard, for a full line of samples furnished him of the ores from that mine and some of its mill products, the examination of which, under the microscope, throws much light on lode formations in general and furnishes important evidence on the points above cited.

Specific Gravity of Gold in Gold-Silver Alloys.

[Paper read by Henry Louis, Singapore, Straits Settlements, before the Chicago meeting, American Institute of Mining Engineers, August, 1893.]

Four alloys of gold and silver were prepared, containing the metals in the following proportions by weight:

1. Gold : Silver : : 1 : 2.62.
2. Gold : Silver : : 1 : 3.15.
3. Gold : Silver : : 1 : 4.11.
4. Gold : Silver : : 1 : 5.17.

These alloys were rolled, with repeated annealing, into thin strips, rather thinner than is usual for assay-cornets. The strips were thoroughly annealed, cut into pieces and dropped into hot parting acid. They were boiled twice with No. 1 parting acid for one hour and ten minutes altogether, and then with No. 2 parting acid for thirty minutes, washed thoroughly with boiling distilled water, and left under water under the exhausted receiver of an air-pump for 30 hours.

Their specific gravities were then taken with the following results, the temperature being 15° C.:

No. of Experiment.	Weight of gold in air.	Weight of gold in water.	Weight of equal bulk of water.	Specific Gravity.
	Grains.	Grains.	Grains.	
1.	9.408	8.946	0.462	20.36
2.	13.897	13.209	0.688	20.20
3.	13.627	12.956	0.671	20.31
4.	13.170	12.566	0.604	21.8

The quantities operated on were very small, and the balance and weights by no means first-rate, so that the results are not likely to be very accurate. The first three results are sufficiently close together, but the very high figure obtained in the fourth experiment must, in all likelihood, be due to some error. Hence, it will be safest to average the results of the first three experiments, and, pending a more complete and accurate investigation, which I hope to make of this subject, to take the specific gravity of the gold residue left on dissolving the silver-gold alloys at about 20.3 at 15° C. Apparently, the varying proportions of the two metals in the alloys do not affect the result.

Gold thus left, on dissolving out the silver, is highly spongy, and, on annealing, it undergoes a very evident shrinkage. The result now obtained proves that, on annealing, the molecule of gold does not contract, but, on the contrary, expands, the shortage of bulk being due to a diminution of the physical interspaces between the particles of gold, while the interatomic distances must increase, the diminution being, of course, greatly in excess of the increase.

With regard to the figures here given, it may be noted that Rose obtained, for the specific gravity of precipitated gold, results varying between 19.49 and 20.72. His figures, taken together with mine, seem to point clearly to the existence of a heavy allotropic modification of gold. It is of

course possible that the brown amorphous gold obtained, either by precipitation or by the removal of the silver from a silver-gold alloy, may be a mixture of ordinary and allotropic heavy gold, in varying proportions. There can, however, be little doubt of the allotropism and of the further fact that gold exists in the alloy in this allotropic form.

A further partial and indirect justification for this latter statement may be found in the experiments of Matthiessen on the specific gravity of alloys (*Phil. Trans.*, 1860, p. 177), in which he shows that the observed specific gravities of gold-silver alloys exceed the calculated ones (calculated upon the specific gravity of ordinary gold) in the ratio, approximately, of 1 : 0.997. This would appear to suggest that the gold in these alloys is in a heavier state than ordinary normal gold, but any conclusions based on these observations are liable to modification, seeing that it is not yet known in what condition the silver in these same alloys exists.

It is possible that these results may afford a clue to the explanation of the widely different specific gravities found by different observers of native gold specimens (containing silver), of approximately the same composition, but from different localities.

In order to complete our knowledge of this subject, it will be necessary to study the character of the gold by dissolving out the alloying metal from a series of alloys of gold with different metals, and I hope to be able to undertake this investigation before long.

Limitations of the Gold Stamp Mill.

[Paper read by T. A. Rickard, of Denver, Colo., before the American Institute of Mining Engineers, August, 1893.]

IN TWO PARTS—PART I.

Milling is one of the metallurgical arts whereby the extraction of the largest possible portion of the value in an ore is effected at the least possible expense. Stamp milling is that particular process in which a heavy body of iron is caused to fall upon the ore so as to disintegrate it and thereby induce a separation between what is valuable and what is worthless. The latter is usually less in specific gravity, and is therefore, by the further aid of water, removed from the former, which is then collected by the use of mercury.

Several similes have been employed to describe this process. The stamp has been likened to a hammer of which the stem is the handle and the die the anvil. The ore upon which the stamp falls has been compared to a nut awaiting the descent of the hammer whose blow is to separate the valueless shell, the quartz, from the valuable kernel, the gold.

When we begin to pursue our inquiries, however, we find that the analogy is just sufficiently true to emphasize the departures from it. The hammer falls, the anvil is fixed; so with the stamps and the mortar. The anvil is made of softer metal than the hammer; so also the die is often, and should be always, of steel or iron less hard and more tough than that of the shoe. The movement of the hammer and the drop of the stamp are both intermittent.

In regard to their intermittent action, as in many other respects, stamp mills arrange themselves under two types, which, though apparently contradictory, have both been evolved from a common original, and are united by a great variety of intermediate modifications. The slow speed and the high drop of the mills of Gilpin county, Colorado, appear to have very little in common with the fast speed and short drop of those of the main gold belt of California; yet the practice of one was largely derived from that of the other, and each has been adapted to the treatment of the ores of its particular region.

The first and most apparent difference is that of speed. In Colorado the drop is regulated at 30 per minute, while in California it averages from 90 to 105. The more rapid drop gives a less intermittent action, and in this respect more nearly approaches the ideal machine.

The work done by the hammer is, however, dependent not only on the rapidity of its blows but also on its weight and the distance through which it falls. Keeping to the two types, which we have chosen as representatives of the two systems of milling, we find that in Colorado the stamp weighs 550 to 600 pounds and falls a height of 18 to 20 inches, while in California the stamp weighs 750 to 850 pounds and drops only 4 to 9 inches. Upon multiplication of these three factors—weight, drop, and speed—we find that the theoretical work done is nearly equal and is about one-horse power.

In milling, however, the efficiency of the stamp as a crushing machine is gauged by the quantity of the ore which it can reduce, and we find that this does not at all correspond to the theoretical equality of the mills. In Colorado the stamp crushes one ton per 24 hours, while in California, with ore of similar hardness, the amount is from two and a half to three times as much. Why is this difference? To explain it we must suppose the hammer to fall not upon the dry and wide surface of an anvil, but upon a face of iron confined within a narrow box and under water. The box corresponds to the mortar or coffer of the stamps. It has no opening save in front, where a metallic opening or screen permits the escape of only that part of the material which has been crushed sufficiently small to pass through the openings. The ore upon the die is under water. The depth of that water depends upon the level of the bottom of the aperture occupied by the screen frame. In Colorado the depth of discharge, as measured by the distance from the bottom of the screen to the top of the die, is 14 inches, but in California it is 4 inches only. Herein lies the key to the difference in the crushing capacity of the two mills. Though the same amount of power be expended, and though the screen used be of similar mesh, yet in the Colorado mill the stamp falls through 10 inches more of water and has to discharge the pulp at a level 10 inches higher than in the California mill. The greater depth of discharge deadens the effectiveness of the blow of the stamp and weakens the force of the splash. Another result is obtained. While the screen does not in either case succeed in sizing the material discharged through it, yet it will be found that, though provided with similar screens, the pulp issuing from the deep mortar has a fineness much greater than that discharged by the shallow one. The pulverized ore is retained by the deep mortar long after its particles have been crushed to a size permitting their passage through the screen openings, and they therefore become repulverized to a further degree of fineness.

This touches upon one of the points in respect of which the stamp mill is most faulty. By actual test it is found that, though using a 40-mesh screen, for instance, with the theoretical supposition of crushing to that particular size, yet in a Colorado mill fully 70 per cent of the pulp, and in a California battery about 50 per cent, will pass through a 100-mesh sieve. The percentage varies with the character of the ore, but these figures may be considered fairly representative. Two causes are chiefly responsible for this. The most important in its effects is the pause which occurs between the successive drops of the stamp. In a Colorado mill the interval is two seconds; in California it varies from three-fifths to two-thirds of a second. Particles of ore, which have been pulverized to a fineness which would permit of their exit through the screen, are enabled to settle towards the bottom of the mortar. It would be expected that the heavy metallic minerals occurring in the ore would, because of their greater specific gravity, be most affected by this feature of the treatment. In practice this is found to be so. The fine slimes contain a large proportion of metallic sulphides, generally valuable on account of their close association with the precious metals, while the coarsest particles to be found in the tailings usually consist of quartz and other minerals forming the less heavy gangue.

The want of any proper control over the regular sizing of the pulp is also due to the unequal and irregular splash of the water in the battery and the hap-hazard way in which the particles of pulverized ore strike against the screen. In the case of any single particle, for instance, it is a question of hit-or-miss whether it be thrown against an opening or a blank. If it fail to pass through, it is thrown back by the recession of the water and undergoes a further agitation and probable pulverization.

In practice this feature of the stamp mill is recognized by both the California and the Colorado millman. On the Pacific coast the mortars are made narrow, thereby diminishing the opportunities for the settling of the particles of ore, and, by increasing the force of the splash, adding to the chances of its exit through the screen. In late years there has also been a tendency to use wire cloth in place of punch iron, for the reason that the former, though having openings of identical size, yet has more of them per square inch than the latter, and, therefore, presents a greater area of discharge. By giving an inclination of 10 degrees to the screen-frame, the exit of the pulp is further assisted.

In Colorado, this defect of the stamp mill has been utilized, and has been made an assistant to the millman. The mortars of this district are wide and roomy, the splash of the water inside the battery is weak, and the pulp remains inside until pulverized to a fineness much exceeding that required for its passage through the screen. There is a reason for this apparently contradictory feature of the milling practice. To explain it we must glance at the ore. We find it to contain an average of 15 per cent of pyrite. The gold is very fine and intimately associated with the pyrite. To separate them it is necessary not only to crush to a certain degree of fineness, but also to obtain conditions which will permit the gold when once separated to settle upon amalgamated plates placed inside. The deep discharge caused the pyrite to remain in the mortar-box long after it has been pulverized to a size smaller than the screen openings; the long drop gives the interval of time required to allow of the settling of the fine gold, while the roomy character of the mortar aids the deep discharge in affording a chance for the gold to get out of the way of the falling stamps and to become amalgamated upon the two copper plates inserted at the back and front of the mortar. In this way about two-thirds of the total yield of amalgam is obtained inside the mortar. In California the introduction of plates is not admissible, in mortars having so shallow a discharge as four inches, because the more constant and more violent agitation of the pulp prevents the settlement of the gold and would cause the abrasion or "scouring" of the surface of amalgamated plates. A certain varying percentage of the gold is, indeed, usually arrested inside, partly by the aid of mercury added to the ore as it is fed into the battery, but this is of such a coarseness that gravity alone would serve to keep it within the mortar.

We have now entered into the discussion of the effects produced by the action of the stamp upon the ore. In many respects it departs from the analogy of the hammer which cracks open a nut. While being lifted the stamp also turns. This is effected by the friction of the cam surface against the under side of the tappet. In a slow-drop mill the stamp makes a complete turn each time it is lifted, but with an increased speed this action is more uncertain and from 4 to 10 drops are required to make a whole revolution.

This feature of the stamp mill breaks the analogy to the hammer and anvil and causes it to resemble the pestle and mortar. The turning of the stamp in rising is communicated to the ore when it falls, and induces a grinding action, which has important results. The mere impact of the stamp upon the particles of gold has the effect of hammering it, of increasing its density and of preventing its amalgamation, while the turning of the shoe upon the die causes the abrasion of the surface of the gold and the rubbing off of any film of foreign matter, which, by preventing contact between the gold and the mercury, is prejudicial to amalgamation. In grinding the ore the stamp, however, also tends to convert it into slime. The hammer which cracks open the nut liberates the kernel without smashing it, but in pursuing the simile we find that the stamp not only breaks the shell, but both the kernel and the shell are further crushed and their particles become confused together. The stamp which frees the gold from the quartz has to deal with a material in which the valuable and the valueless constituents are so uneven in size and so intermixed that the one is often crushed too much and the other too little.

I have seen auriferous quartz which very nearly approached our simile of the nut. The gold occurred in seams and cavities in a quartz which had a honey-combed character. With such an ore there is just a certain blow which will break the brittle quartz and liberate the ductile gold. Such ideal conditions are very rare. The different parts of the same ore usually vary both in hardness and composition. The same work done on two pieces of mill-stuff will produce entirely dissimilar results. In the stamp battery the heavy sulphide minerals are pulverized to a greater fineness than the siliceous gangue. When the gold is not too closely associated with the pyrite, coarse and rapid crushing will produce an adequate separation; but when the metal is in a finely-divided condition and very intimately mixed with the pyrite, then fine crushing is demanded, and can, unfortunately, only be obtained by the production of a very undesirable excess of slimes.

One More Prehistoric Toad.

TO THE EDITOR:—The Tacoma toad mentioned in your issue of the 26th ult. as being resurrected from under 17 feet of hardpan reminds me of a similar case I witnessed when a boy 11 years of age, in 1848, in Oxford county, Canada.

It was a dry autumn, and the family well, about 15 feet deep, and then in use seven years, "went dry." It was deepened to the extent of three or four feet. The extra sinking was partly through a soft sandstone and shaly rock, some of which, however, was hard enough to answer for the additional curbing required. When these stones were being broken to fit them for use in the well, one of the softer of those broken disclosed a cavity, and out dropped a curious-looking, medium-sized toad, nearly the color of the rock.

To all appearances the toad was dead. All the members of the family were called, and the man from the well, to see the curiosity. The cavity was but little larger than its occupant. The stone or soft shale had broken into two pieces, and these, when fitted together, showed clearly a sealed cavity. While we were all wondering at the circumstances, his toadship added to our surprise by recovering consciousness and hopping about. He was seen a number of times the next few days in and about a cluster of weeds in which he had taken refuge, and was always readily recognized by his peculiarities.

I have not related these facts for more than 20 years, because of the lack of credence they were invariably received with, but now that I see a well-authenticated parallel case on record I repeat them. F. C. GARBUTT.

Abiquiu, New Mexico, Sept. 12, 1893.

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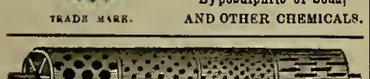

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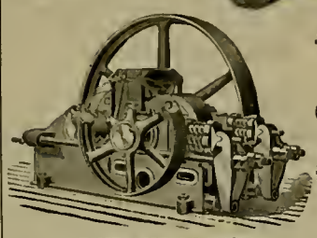

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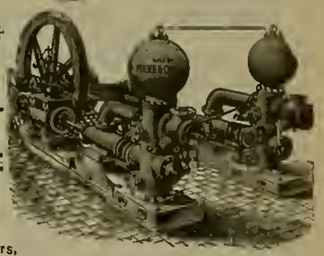

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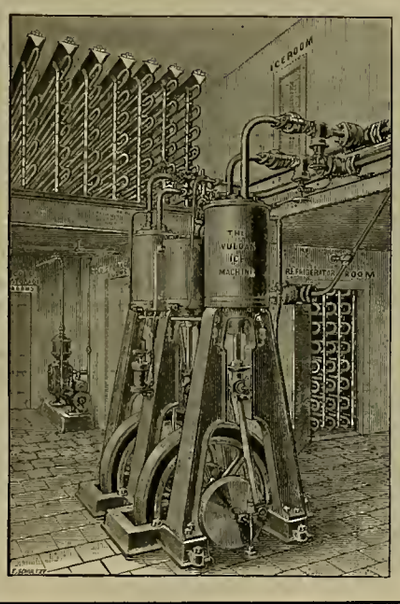

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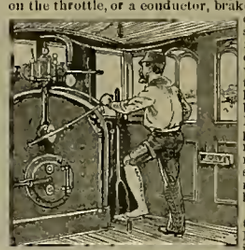

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Mechanical Progress.

New Railroad Snow-Clearing Device.

George H. Johnson of Sisson, Cal., has secured a patent on a device to clean thoroughly the inner sides of the track rails of snow which lies in the path of the wheel flanges and ordinarily gets impacted, forming an obstruction to progress with a tendency to increase. This device is adapted to he secured directly forward the engine trucks. The device comprises primarily a transverse heam linked to hangers, the heam heing provided at each end with a peculiarly formed scraper of metal, having a snout or lip depending ahout half way down the rail, or some deeper than the reach of the wheel flanges. This scraper point is inclined like a plow point and scoopes up the snow, which is deflected outwardly hy a curve in the plate. It is the ohject of this invention, furthermore, to adapt the device to he raised out of operative posltion when not required. For this purpose, angle levers are pivoted in hangers from the main frame, and connection ls made from one of the angle arms by a rod to an air cylinder. In operation, the points of the shovels or plows travel along the inner side of the head nf the rail and to a depth about equal to or a little greater than that of the wheel flange. Their position is regulated hy the swinging movement of the frame which carries them, wherehy they may not only he set to the required depth, hut can be raised entirely out of the way when necessary. The normal position is a elevated one, in which they are entirely out of operation. This is due to a spring forcing the piston forwardly, which, through its rods, draws the lever rod backwardly, and this rod, through the angle lever, raises the lower end of the frame, the frame turning ahout its pivoted link connections and lifting the points of its shovels or plows ahove the rails. When it is desired to throw them down for action, steam or compressed air is forced in, forcing the piston hackwardly, and hy reversing the movements of the parts heretofore described, throws the frame downwardly so that the points of the shovels or plows are hrought down to position and are held there by whatever pressure may he necessary.

Ferris' Great Wheel.

As a mechanical triumph the Ferris Tension Wheel stands out holdly as one of the wonders of the age, horn in Chicago and the creation of Mr. G. W. G. Ferris, Pittsburg, Pa. That the Ferris Wheel surpasses Eiffel Tower of the Paris Exhibition there is no doubt, and it is a more wonderful achievment hecause it was a venture on unknown grounds, while the Eiffel Tower was constructed on well-tried scientific prlnciples. This immense structure, consuming in its various parts over 4000 tons of iron, 2600 tons of this heing in motion, under control of two immense engines, rises ahove Midway Plaisance 264 feet. The 36 coaches are models of comfort and are daily filled with passengers who enjoy the magnificent scenery and the cool, exhilarating amusement. These coaches hold 60 persons comfortably, giving a comhined carrying capaclty of 2160 passengers.

There is ahsolutely no danger ln riding on the Ferrls Wheel, as every precautlon has heen taken to provide against accident, and all persons who ride once are anxious to go again and hring their friends to enjoy the heautiful scenery.

The 36 cars used to convey passengers around the wheel are perfect in construction and admirahly adapted to this peculiar use. These cars are 13 feet in width and 26 feet long, containing 40 chairs for passengers, although the carrying capacity of each car is 60 people. They are built of yellow pine, with cnrrigated iron roof, and in all details of construction are strong and durahle. The windows are of three-elghths inch French plate glass calculated to resist the strongest wind. There is no great motion in the cars as the wheel revolves, owing to the manner of their suspension on six and one-half inch steel trunnion pins, which pass through the outer cord.

A New Rowing Device.

A local inventor has devised a new scheme (or rather a new modification of an old scheme) to drive row-hoats hy propeller propulsion. The "oar" handles are only ahout two feet long, and lnstead of terminating in hlades they connect with metal rods which lead aft to either end of a screw-slotted crosshar. Through this slot runs the propeller shaft, which for ahout three feet of its length has a screw thread. By applying the oar leverage to the cross-har, the shaft obtains a rotary motion from the screw thread, and on the recovery of stroke the slot opens so as to permit the bar to slide back without givlng it a reverse turn. It seems very complete, even to a contrivance that reverses the opening and closing of the slot ln order to back water, and not the least of the merlts claimed for the invention ls that the oarsman faces the how instead of the stern, although applying his muscle in the same directlon as in ordinary rowing.

The scheme will probably work, but lt will doubtless be found that no increased speed over ordinary methods will be ohtained.

Doing Away with the Dead Center.

A new crank which does away with the dead point is the asserted invention of a French engineer. The crank-pin works ln a slot cut in a steel disk fastened to the end of the shaft, and is pressed upon hy a spring, which is so adjusted that at the ordinary working steam pressure it is held firmly in place. If, however, the crank he at a dead point, when the full pressure of the steam is admitted into the cylinder, the spring is compressed, the crank-pin slides into the groove so as to assume an angular pnsition to the shaft, and the latter begins to revolve. As the pressure of the steam in the cylinder, while the engine is in motion, is less than in the boiler itself, as soon as the shaft hegins to turn, the pressure against the spring is relieved, and the crank-pln flies back to lts usual position. The tension of the spring is adjusted as necessary.

Wear in Wrought-Iron Bridges.

Speaking at the Engineering Congress at the World's Fair, Sir Benjamin Baker stated that in examining old wrought-iron bridges he had found that the hridges had suffered most at the joints, and not at places where the strain sheets would show the greatest fatigue. In the case of hridges having trough floors, for example, he had found that the failures were serious where the flooring was connected to the webs of the main girders. He had seen the web plates nearly cut through with the wriggling of the connections, and considered it to he better practice to put the troughs directly on top of the angle-plates. In other riveted parts he had found the greatest wear from the loosening of the rivets.

Compressed-Air Transmission.

It was stated in a recent lecture by Prof. Unwin, that compressed-air transmission ls practically up to at least 20 miles; 10,000-horse power can he transmitted 30 miles in a 30-inch main at 132.3 pounds per square inch, with a loss of pressure of only 12 per cent; the efficiency is 59 to 73 per cent, if the air is reheated and 40 to 50 per cent if lt is used cold.

One Hundred Miles an Hour.

Messrs. Duhbs, the well-known locomotive builders, of Glasgow, have in hand a monster express locomotive, designed by Mr. Michael Reynolds, consulting engineer, Wolverhampton, which constitutes a complete departure from modern practice. The horse power is 2000, and the speed 100 miles per hnur. The driving wheels are 12 feet in diameter, and there are three cylinders of 48, 28 and 18 inches in diameter, with a 30-inch stroke. The boiler pressure is 205 pounds. It is proposed to run from London to Edinburgh—500 miles—in six hours.

Aluminium for Bullets.

Dr. C. E. Parent, of this city, proposes to make bullets from alumlnium. He hases hls claims upon the superior hardness and lightness of aluminlum; says the soldier could carry more ammunition; that it would not flatten against a bone and produce a ragged wound, as lead does, and would not he so likely to poison the wounded man if the bullet could not be extracted. He does, however, insert a piece of lead at the point of the bullet to give it weight and control its flight.

Steam for Buggies.

A steam huggy is being built in Boston. The wheels are like those of the safety bicycle, with seats for two over the front pair, and the hoiler, water and naphtha tanks hetween the rear wheels. The engine is vertical, 2x4-inch cylinder and 4-inch stroke; it communicates power to the rear drivers by a chain gear. The gulding is done hy the front wheels and all controlling devices are under the hand of the operator. The total welght of the vehicle is 400 pounds and a speed of 10 miles per hour is expected.

Brakes to Help Start Cars.

An attempt is belng made in England to utilize the power ahsorhed in the application of the brakes to tram cars so as to render aid in restarting the car. A spring is charged, which can he released and will start the car without the aid of the horses. A forward and not a recoil movement is at once given to the wheels, but its action can he reversed in case of need—such as to overrunning points at junctions.

Scientific Progress.

The Telotype.

The telotype, or electrical typewriter, has heen designed to meet the requirements of a rapid and reliable printing telegraph instrument—a thing long needed. This instrument is manipulated very much in the same way as a typewriter. The transmitter, as well as the receiver, makes a copy of the message, and the llahility of mistakes ls thus largely decreased. The instruments work ln unison, and it is impossible to send a message from one machine unless the corresponding machine at the other end of the line is properly receiving. The record ls plainly prlnted on the strip of moving paper in front of the operator. The fact that the message is printed at the other end of the line without any personal attention makes the arrangement an exceedlngly valuahle one. The same instrument can send and receive. This new method of telegraphic transmission is said to have given great satisfaction wherever used, and is no doubt destined to extended employment.—The Ohio Valley Manufacturer.

Evidence from Ashes.

An officer of the Mint at New Orleans has been arrested and committed for trial on remarkahly scientific evidence. It was his duty to burn the bills which were returned to the Mint and were not to he relssued, says the *Christian Herald*. A box containing a large amount of money in currency was given to him to destroy, and a record was kept of the number of blls of each denomination which were in the box. The ashes of the hills were carefully collected and turned in by the clerk, as proof that he had destroyed the hills, as his duty required. They were weighed hy the chief inspector and were ahout the weight that the ashes of the bills should he. On close examination, however, it was found that among the ashes were the heads of several hurnt matches, which would, of course, count in the weight. It was evident that certain hills, the ashes of which, if burned, would correspond in weight to the match-heads, could not have been burned. Suspecting that the clerk had stolen the hlls, instead of hurning them, the next step was to ascertain the value of the hills abstracted. The ashes were submitted to a Government expert, who analyzed them and reported that currency of the value of $25,000 had not heen burned. On heing asked how he had discovered the amount, he stated a fact not generally known. It appears that the coloring matter used ln the hills varies with each denominatlon, and that in all cases it has a metallic hasis which ls unlnjured hy fire or water. The tests showed that in the ashes there was none of the indestructible basis peculiar to the one thousand, five hundred, or one-hundred dollar bills, although there were several hills of those denominations among those given to the officer to hurn. As there was a possihility of his havlng used them, instead of hurning them, he was arrested. Douhtless the officer was not aware that the Government possessed so ingenious a means of testing his prohity, otherwise he would not have reserved the bill from destruction.

Aluminium Flashlight.

Professor Glasenapp emphatically advocates the use of aluminium in place of magnesium for the production of flashlight. He states that aluminium, if employed in the form of hronze powder, is equal to magnesium as a source of light in taking photographs hy flashlight, and that lt is much cheaper than the latter, says the *Scientific American*. The followlng mixture is recommended hy the author:

Aluminium	21, 7 parts by weigbt.
Sulpbide of antimony	13, 8 " "
Potassium cblorate	64, 5 " "

In preparing this mixture the same precautions are to he taken as in the case of magnesium flashlight. As the rapidity of combustion of the above mixture, one-seventeenth of a second has heen found out. Two grammes of the mixture were burnt in a small heap, 2 cm. long and 1 cm. wide. With regard to the chemical intensity the author has found, hy exposing gelatine plates heneath a Warnerke actinometer to the light of the above mixture and to that of other mixtures prepared with magnesium, that hy employing equal quantities of metal the aluminium light is superior to the magnesium light, though not very considerably. The speed of combustion is slower (about one-fifth of a second) if the following mixture is used:

Aluminium powder	30 parts by weight.
Potassium chlorate	70 " "

To Duplicate Hand-Writing.

An interesting invention hy an Italian nohleman, Marquis Fontl, is described at great length in a late issue of *La Nature*. It is called the higraph, and, as its name implies, is desigued to produce a fac-simile of a writing at the same tlme the original is made. This ingeninus device is provided with two pens which are supported hy the framework in such a manner that their points are always in the same horizontal plane. The pen to the right hand is intended for the operator or writer, and the last stroke made hy this pen is at the same tlme duplicated hy the one on the left. The framework is so jointed and hinged that the pens can be moved in any direction. A counter-halance takes the weight of the frame from the hand, so that the act of writing ls made almost as easy as with the usual

pen and holder. Two ink wells are provided at the base of the stand, and the dipping of a pen in one well causes the pen to dip in the opposite well. When the two sheets of paper to be written on are placed parallel to each other and secured, the remainder of the work is as simple as ordinary writing. The instrument is designed to enter an unoccupied field of usefulness, such as providing duplicates of contracts and a variety of legal and other documents which it is often desirable shall not only be duplicated in words, but also in paper and the hand-writing of the author or maker.

The Lantern in Stage Effects.

Some new scientific stage effects were introduced into a recent performance of Wagner's "Die Walkure" at the Grand Opera House, Paris. The scene where the sons of Wotan, mounted on steeds and brandishing their lances, are seen in the clouds is described as very realistic, says the *Scientific American*. The foreground is wild and rocky, and the clouds are seen to scud across the sky. This effect is produced by projecting the image of a cloudy sky by an electric lantern on a curtain of translucent blue cloth. The continuous movement of the clouds for half an hour is produced by painting them on the edge of the disk of glass 12 inches in diameter and rotating the edge past the lens of the lantern. Three lanterns are employed to blend the clouds. The wild cavalcade of Wotan's heroes is produced by a line of mechanical horses, full sized, and carrying real performers. They are supported on a scaffolding, and drawn by means of a cable across the scene at a suitable elevation. The mounted men are strongly illuminated by the electric light, and thus rendered visible through the translucent curtain representing the heavens. The scene terminates by a conflagration, in which great flames run along the rocks, while thick fumes, reddened by Bengal fire, spread through the atmosphere. The flames are due to fulminating cotton, placed in advance on the rocks, and lit by the machinists. Lycopodium powder is also blown through holes in the stage. Weird cloud effects are produced by steam.

Metric Equivalents.

The metric nomenclature is coming into such common use, especially in scientific articles, that the following formulas will be found valuable:

WEIGHT EQIVALENTS.

To convert grains into grammes, multiply by	0.065
To convert grammes into grains, multiply by	15 5
To convert drachms into grammes multiply by	3.9
To convert ounces (avoir.) into grammes, multiply by	28 4
To convert pounds (avoir.) into grammes, multiply by	453.6

MEASURE EQIVALENTS.

To convert cubic centimeters into grains, multiply by	15 5
To convert cubic centimeters into drachms, multiply by	0.26
To covert cubic centimeters into ounces (avoir.), multiply by	0.036
To convert pints into cubic centimeters, multiply by	473
To convert liters into ounces (avoir.), multiply by	35.3
To convert gallons into liters, multiply by	3.8

—Scientific American.

The Yerkes Telescope.

The steel tube of this telescope, which is to be erected shortly in the Geneva Observatory, Chicago, is said to be 68 feet in length, made of sheets graduated in thickness from five-sixths of an inch at the center to one-eighth of an inch at the ends. The weight of the tube is over six tons, the diameter 38 inches at the eye end, 52 inches at the center and 40 at the o.g. The weight of the object-glass itself is 750 pounds.

To Fireproof Combustibles.

A Russian inventor has brought forward a simple substance for fireproofing combustible materials, and its efficacy, it is reported, has been tested with gratifying results under the auspices of the Moscow Imperial Society of Agriculture. In the public experiment, a shanty was built entirely of straw, and, after being covered with the fireproof substance, was submitted to a hot fire, the straw, under this operation, merely changing from a yellow to a reddish-brown color, without igniting or even cracking. It is stated that the society has decided to introduce this new process throughout the Empire, considering that it must prove of the highest service to the numerous straw-thatched houses in the Russian villages.

THERE was recently described in a foreign journal a new form of apparatus in use at the Royal Research Laboratory, Berlin, for testing the comparative hardness of different materials. The substance to be tested is prepared with a smooth or polished face, and scratched with a diamond. This diamond has a point as nearly as possible conical, with an angle of 90 degrees, and is drawn over the substance to be tested under a constant pressure. The hardness is then estimated by the width of the scratch made, which is made by a micrometer. The following comparative results were obtained, and are expressed in arbitrary units, which are inversely proportional to the measured breadths of the lines: Lead, 168; tin, 234; copper, 398; zinc, 426; nickel, 557; soft steel, 765; glass, 1355; hard steel, 1375.

It has been shown by analysis that a young person weighing 154 pounds is composed of 96 pounds of water, three pounds of white of egg, a little less than one pound of pure glue, 34½ pounds of fat, 8½ pounds of phosphate of lime, one pound of carbonate of lime, three ounces of sugar and starch, seven ounces of flouride of calcium, six ounces of phosphate of magnesia, and a little ordinary table salt.

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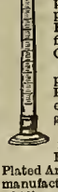

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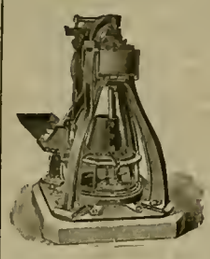

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Electricity.

A Mill Where Belts Are Not Used.

A new Belgium factory, we learn from a foreign exchange, uses electricity to transmit its power instead of belting. The dynamo is 500-horse power and forms the flywheel of the compound Corliss engine. The shop is supplied with 16 motors, among them ten 16-horse power, one 21-horse power and one 37-horse power motors. Their average efficiency is 87.2 per cent. On some of these motors the load is very variable, and several are exposed to dust and dirt, so that with 90 per cent efficiency of the dyoamos, 98 per cent of the conductors, 87 per cent of the motors, the net result is 76.6 per cent power delivered. As the lost work in belt-driving is practically a constant quantity for all loads, or at least is usually considered to be, the power required to turn the shafting, pulleys, etc., when no work is being done on the machines, it follows that taking 79.4 per cent as the final output in two cases, one of electrical and the other of mechanical transmission, we find that at a load of 20 per cent the electrical system would still give 47.2 per cent useful effect and the mechaolcal nothing at all. From careful experiments which have been made in actual practice, it has been clearly proven that to drive all the machines idle needs more power than to drlve the shops in ordinary course of work; whereas 11 electrical horse power is required when driving all the tools ldle, only about seven electrical horse power is needed in ordinary work, of which four electrical horse power is used to drlve the shafts, belts, etc., alone; this clearly shows how small a part of the power prodnced by the eogine is actually used in useful work at the tools.

Such satisfactory results of the application of electricity to factory driving must attract attention and will doubtless lead to great changes in transmission. Whether in the case of large machine tools it would not be better to discard shafting and belts altogether, and supply a special motor to each tool, is a question which must be settled for each individual case which may arise; the current could be switched on or off just as easily as the belt is now thrown from the loose to the fast pulley, and vice versa.

Electricity on Steel Cementation.

The influence of electricity on the cementation of steel seems likely to throw light on the physics of the process. M. Jnles Garnier has recently published the results of his first experiments in this direction in which a current of electricity was made to form a circuit, with the carbon packing as anode and the iron to be heated as cathode, says *Engineering*. Both the metal bar and the carbon were inclosed in a tube, which was placed horizontally in a small reverberatory furnace, and heated during the experiment, his idea being that the heat would determine the mobility of the carbon, while the electric current would determine the direction of motion of the carbon atoms. The minimum voltage reqnired to overcome the resistance was employed. The conditions were 7 volts, 35 amperes and 3 hours, at a temperature of from 900° Cent. After the experiment the bar was examined, and the cementation was found to have penetrated to a depth of 10 mllimeters. In a second experiment, two bars of metal formed the electrodes, and were separated by a carbon packiog. In this case, with a current of 55 amperes at 2.5 volts, after three hours' heating the anode bar remained unchanged, while the cathode was hardened to a considerable extent on the side opposed to the anode.

The Storage Battery.

It is more than likely that the storage battery in street aod railway traction, as at present developed, is not immediately practical, except in special or limited conditions, says an exchange. Its more immediate and promising field is in the central-station business. In some parts of Europe this has formulated in a grand success, the result showing an income on the capital invested that has established its economic and commercial value. More than this, and here as elsewhere, the manufacturing interests are insisting on all possible economics to realize even a minimized margin on the profits of production. This demand is incessant and unappeasable, and it needs no prophet to forecast the place electricity will occupy in solving the present problem. There can be no doubt that a vast amount of electrical machinery is allowed to stand idle during the day, when it might be used in storing batteries to run lights at night. This system, as adopted in Paris, works satisfactorily both in a practical and remunerative sense. With proper management in its special fields there can be no reasonable doubt that the storage battery has a future in public and indnstrial service that will be in keeping with its development and efficiency.

New Electric Block Signal.

An electric block signal is in use at the Weehawken tunnel in New Jersey. Incandescent lamps are placed at intervals of about 100 feet and divided into two sections. The heig ht of the lamps is such that they are on a line with the window of the cab of the locomotive. Normally they are lighted, indicating safety and a clear track. When a train enters the tnnnel at the east portal all the light outside the tunnel for a distance of 500 feet and those for 300 feet inside are switched off automatically as well as the alternate lamps for 900 feet farther into the tunnel. The overlap lamps, which alternate with the lamps ln the first section, are left lighted while the trains runs on to a point 2300 feet inside, where the lamps in the second or middle section are put ont, thus producing a dark section of 1100 feet immediately behiod the train, which is maintained until the tunnel is passed. At the same instant that the lamps in the second or middle section are pnt out, those in the first section of 1200 feet are lighted, so that when the train has reached a point 2300 feet in the tunnel the signal to proceed is displayed at the east end for a following train. When the train passes out of the tunnel at the west end the lamps in the middle section are lighted. This is all done automatically by the trains passing over an electrically connected track circuit, all the parts of which are very simple and can be maintained by an ordinary lineman.

Electrical Power for Brick Machines.

In Auburn, Me., Mr. Charles Duon, one of the most progressive brick manufacturers in New England, has arranged an electric motor to do the work of horses in grinding. In all yards where horses are used it is an established fact that one of the greatest troubles experienced in the windlass and treadmill is the rapid declioe of the horses, as the strain upon their shoulders is so great that they succumb in a very short time. Other New England manufacturers are adopting the use of electricity in their plants, and with such excellent results as to premise the opinion that it will soon become universal, so says the *Clay Record*.

More Light from a Dynamo.

A New York inventor, S. L. Trippe, proposes to make a given dynamo perform service, with the same efficiency, for three or four times as many incandescent lights as at present. His theory ls that after a filament is heated to lncandescence the current may be switched off momentarily and be brought back again to keep the gleaming thread from growing dim. He therefore interrupts the electric flow in such a manner as to take three different circuits in turn; and on each of these he undertakes to sustain as many lamps as were originally run on the single circuit. Every one familiar with this style of lamp knows that the fiber contioues to glow for an appreciable length of tlme after the current is turned off. Whether enough electricity will be supplied, however, in the short flashes of supply provided for under this plan to keep the light up to the proper intensity, is something which only experiment can show.

New Fire Alarm.

An apparatus which is susceptible to the expansion of air by heat has been devised in England to act as a fire alarm. The contrivance consists of three essential parts, the air-box, the pulsator and the indicator. When a fire takes place, the air in the box, which is fitted to the ceiling of a room, is expanded, causing the inflation of a thin, hollow india-rubber diaphragm, by which an electric current is produced, which rings an alarm bell and releases a semaphore. After numerous experiments, it is said the instrument has proved to be practical in its application.

New Method of Signaling.

Experiments are being made on the Great Northern railway of England with a method of signaling directly in front of the driver's eye. Contact is made by a brush on the engine rubbing on a rail or wire. If a current is seot from the signal-box to the wire, the circuit is completed with the engine, and the little semaphore on the locomotive drops. Somewhat similar devices were shown at the Crystal Palace Exhihition ten years ago, says the Chicago *Journal of Commerce*, but railroad men do not seem to regard them with much favor.

Disinfection by Electricity.

A new electrical disinfecting system is announced, which consists in passing a current of electricity through sea water, or any solution containing chlorides, and by this means developing hypochlorides, which are powerful disinfecting agents, and can be manufactured cheaply in this way upon a large scale.

Useful Information.

The World's Coal Production.

The *Journal des Mines*, in a receot issue, publishes some particulars of the coal production of the different countries of the world. The coal-mining area of the United States is estimated as follows:

Carboniferous Soil. — Aothracite, 985 square miles; Appalachian, 64,395 square miles; Central, 47,250 square miles; Western, 98,700 square miles; Michigan, 6700 square miles.

Trias and Jurassic. — Richmond-Piedmont, 170 square miles; Deep River, Dan River, 500 square miles.

Cretaceous and Tertiary.—Western Plains, Rocky Mountaios, 20,000 square miles; Mt. Diablo, Cal., Washington, Wyomiog, etc., 11,300 square miles.

New geological workings and new private discoveries have evidently increased this number. The following tables gives the areas of the several mioes in the different conntries:

	Square Miles.	Per Cent.
United States	250,000	58.7
English America	56,000	13.1
Great Britain	12,000	2.8
Spain	4,000	0.9
France	2,000	0.5
Germany	1,800	0.4
Belgium	518	0.1
Other countries	100,000	23.5
Total	426,318	100.0

It thus appears that North America possesses a coal area largely in excess of the rest of the globe. The total production of coal in the year 1891 amounted to 520,000,000 tons. Supposing that 300,000,000 tons were used for domestic purposes, there remain 200,000,000 tons employed for the production of motive power in the different industries of the world.

Mining Royalties in England.

Statistics recently given on the miniog royalties in Great Britain show that the time limit of mining leases varies from 21 to 63 years. A fixed rent is usually payable, merging, however, into the royal rent. Royalties are generally a fixed sum per ton, hut sometimes they vary with the price of coal Where the amount payable for royalty upon coal raised in any year is less than the fixed rent, the difference is known by the term "shorts." Lessees often have the right to work out coal paid for as shorts in subsequent years. Sometimes a lease contains a power to surrender, and as a rnle a lessee ls prohibited assigniog without the permission of the lessor. Special promioence is given to "wayleaves." A wayleave is a leave to pass over or under land not included in the mining lease. For this leave the owner exacts a payment, generally of a penny per ton, but he has the right of refusing any leave whatever.

The estimated total royalty payable in 1889 on coal was just over £4,000,000, and the estimated wayleave charges were over £200,000, makiog a total of £4,200,000. Takiog the total output for the year as 177,000,000 tons, the royalty and wayleave is equivalent to rather more than fivepence per ton. As regards iron ore, the royalty is estimated at £561,000 on 14,500,000 tons, about 9¼d. The estimated royalty for all other metals, *e. g.*, copper, tin, lead, etc., is estimated at £87,068.

How to Grind a Cold Chisel.

Grind the chisel a trifle ronndlng, so as to make the middle cut before the sides and corners, for the middle portion is the strongest and will staod more than the corners, advises the *Horseshoers' Journal*. Have the chisel drawn to a nice taper, not too slim or too chuoky, but about the proportion of one-eighth of an inch thick at the point and three-eighths of an inch thick two inches back from the point, a taper of one-fourth of an inch in two inches, or one-fourth to one and one-half to the foot. For heavy chopping, increase this to two ioches to the foot, but for ordinary work the taper given is about right. Begin about a quarter of an inch back from the point and grind for your cuttiog edge, keeping the bevel about equal on each side of the center and bring it down almost to an edge, then make the real edge by grioding to a little more abrubt taper. This will be found to make a very strong cutting edge and one that will last looger than when the cutting edge is ground on a long bevel. We want all the metal possible right at the edge, that we can get without making the cutting edge too thick and clumsy, and the writer's experience with cold chisels has seemed to show this form well adapted for general work.

To Estimate Brick Work.

Ordinary bricks are about eight inches in length, and, with a mortar joint, ahout half that in width, so that each brick on the flat will give a horizontal surface of about 32 square inches, or 4½ bricks will cover one square foot, says an exchange. As ordinarily laid, there are nine courses to every 24 inches, or 4½ to the foot; 4½ courses, with 4½ bricks to the conrse, will give 20¼ bricks to the cubic foot. Waste, cntting and close joints will easily require an allowance of 21 bricks per cubic foot, which will be found a very coovenient figure for estimating the number of bricks required for a wall of given height and thickness, as it thus becomes uonecessary to find the cubic contents of the wall, but merely to multiply its face area, or the product of its length and

height in feet by seven-fonrths of its thickness in inches, whicb, as the thickness is always some multiple of four inches, is a very simple process.

Useful Hints.

To make a glue that will stick, take a quart of water, add two pounds of best glue and dissolve by heat; allow this to cool, when add gradually seven onnces of nitric acid; when coid, put into bottles. It will not harden, but form a strong cement.

To renovate velvet, free it from dust by laying face down and whipping smartly; then brush with a soft hair-brush; dampen on the wrong side with borax water, and hang pile inward in the sunshine to dry, taking care that there is no fold or wrinkle on the line.

This is the proper way to peel tomatoes: Cover them with boiling water half a minute, then lay them in coid water until they are perfectly cold, when the skin can be slipped off without difficulty, leaving the tomatoes unbroken and as firm as before they were scalded.

To remove paint from window glass, take a sharp putty knife that has a perfectly even nnnicked edge, and scrape off as much as you can without danger of scratching the glass. Then mix a little oil and turpentine with fine pumice-stone and carefully rub off the remainder. Clean with soap and wash and polish in the usual way.

It is frequently asked how much mustard should be given if it is desired to make a patient sick in case of croup or poisoning. A tablespoonful of ground mustard to a tumblerful of warm water is the rule. Salt is almost as efficacious as mustard if the latter is not at hand. If the first tumbler has no effect, give more and tickle the back of the throat with a feather.

Coal Mines and Health.

If one may judge from the physique of the underground toilers of the Black Conntry, they present an appearance more provocative of envy tban of pity, says London *Hospital*. Disease is no more demolishing in its raids among them as a class than it is among the agriculturists and laborers. If one can be guided by statistics, the coal-dust atmosphere in which their life is passed is no element of any serious evil to them. It may not be pleasant, but it is not unhealthy; indeed, the actual death rate of those miners is not abnormally high, even when it includes the fatal wholesale disasters whicb occur from time to time in the pits. However much reason tbe promoters of the pending coal strikes may have to substantiate their tbeories, the evil of any extreme insanitary condition of the workers themselves below ground cannot in any fairness be included.

Experiment with a Cedar Shingle.

A correspondent of an English lumber paper gives the following information on an experiment made with a cedar shingle. A green shingle, fresh from the saw, was measured and weighed, care being taken to get both exact. It was found that it weighed seven ounces. It was then dried and again weighed and measured. It had shrunk nearly one-eighth inch, while the weight had decreased from seven to three ounces. It was tben submerged in water 24 hours, and the size had not changed a particle, while the weight had increased about one ounce. He claims that this demonstrates the superiority of cedar shingles over others, as, when once dry, they will neither shrink with excessive beat nor pry one another off the roof in wet weather.

Cultivate a Memory for Names.

"As good a piece of advice as I could give a young man starting into business," said an old, successful merchant, "would be to get his customer's name right. Of course, everyhody means to do this, hut I don't thlnk everybody attaches to lt its full importance. The fact is that almost every man is proud of his name, whatever it may he, and he dislikes to see it misspelled or incorrectly wrltten. There are plenty of names which sound alike but which vary in the speliing, perhaps only a single letter; and, too, ln taking a man's name, it ls not so difficult as one might imagine to make a mistake in the initials, for there are letters which sonnd very much alike. When you get a new customer, get his name right to start with. No man likes to receive a package or a hill or a communication of any sort with his name misspelled; however modest and good natnred he may be, he is pretty sure to he annoyed hy it.

Gold and Silver in the Arts.

More silver and gold are used in the industrial arts in the United States than in any other country. Our annual consumption of gold for this purpose amounts to over $16,000,000, and of silver to over $7,000,000. Germany is the next greatest consumer of the precious metals for manufacturing pnrposes, and each year works up about $12,000,000 worth of gold and about $6,000,000 worth of silver. France uses about $8,000,000 worth of gold and $4,000,000 worth of silver.

Lemon Syrup.

Take one pint and a quart of juice, two pounds of sugar. Let the juice stand in a cool place to settle. When a thin film is formed on the top filter the juice, add the sugar, and finish in the bain-marie. If the flavor of the peel is desired with it, grate off the yellow rind of the lemons and mix with the juice to infnse, or rub it off on part of the sugar and add it to the remainder when you finish it. Orange syrup is made in precisely the same manner as lemon syrup.

World's Fair Distances.

To see the World's Fair and walk through the buildings the grand total is something in excess of 118,000 feet, or nearly 23 mlles. This estimate does not include State, Government or private buildings; the plaisance is ignored and no account ls taken of tbe long jumps from one building to another. A walk of about 40 miles is necessary to do the whole thing up.

A New Rain-Maker.

Rain-makers have a rival in J. M. Matthews, of San Antonio, Texas, who is working on a new rain-making process. He is building a buge revolving wbeel, witb which to produce a cyclonic pressure of hot air upon the cold stratum of air above the earth, and thus condense the moisture in the hot air into raindrops.

Cal. Debris Commission Notices.

NOTICE.—The California Debris Commission, duly appointed under the act of Congress of March 1, 1893, having received a petition from B. Below and others for permission to mine by the hydraulic process in the Polaris, Etna and Austral mines, situated in the Goodwin Township, In Plumas county, California, and to deposit tailings behind a dam to be built in Hopkins' creek, gives notice to all concerned that a hearing will be held at the office of the Commission, Room 92 Flood Building, San Francisco, on October 10, 1893, at 1:30 P. M. On and before this hour and date, all parties interested may file affidavits, plans and maps in support of their respective claims. By order of the Commission. W. H. Heuer, Major, Corps of Engineers, Secretary.

NOTICE.—The California Debris Commission, duly appointed under the Act of Congress of March 1, 1893, having received a petition from A. Steinberger for permission to mine by the hydraulic process in the Brandy City District, situate at Braudy City, Sierra County, California, and to deposit tailings in an old hydraulic pit, gives notice to all concerned that a hearing will be held at the office of the Commission, room 92, Flood Building, San Francisco, on October 10, 1893, at 1:30 o'clock P. M. On and before this hour and date, all parties interested may file affidavits, plans and maps in support of their respective claims.—By order of the Commission: W. H. Heuer, Major, Corps of Engineers, U. S. A., Secretary.

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Table of Contents.

The following brief abstract of the contents will give an idea of the branches of the subject treated:

General Plan; Discussion of the Principles of Hydraulics; Rules Deduced from Formulæ Obtained; Examples and Calculations; Extensive Tables for Ready Reference; Fundamental Laws of Hydraulics Demonstrated and Expressed in Formulæ and Rules; Flow of Water through Openings; Weir Coefficients; Triangular Weirs; Flow of Water Over Quadrant Weir (tabulated); Application of Tables; Submerged Orifices; Flow Through Orifices in Thin Partitions; Tables and Applications; Miners' Inches; Tables and Calculations; Flow of Water Through Short Tubes and Compound Tubes; Flow of Water Through Pipes; Tables of Velocities and Cubic Feet Flows for Given Fall per Mile and Diameter of Pipe; Coefficient for Bend—Circular and Angular; Flow Through Nozzles; Inverted Siphons; Flow of Water in Open Channels; Extensive Tables; Rough and Ready Notes; Hints for Speedy and Approximate Estimates, etc.

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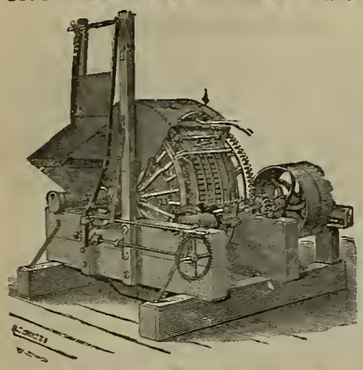

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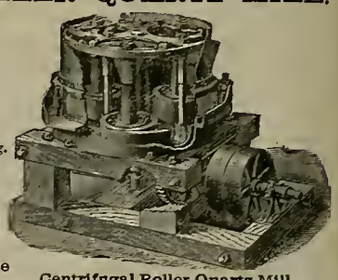

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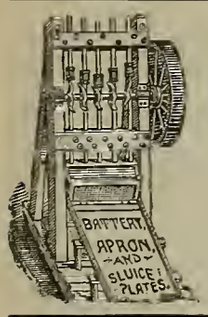

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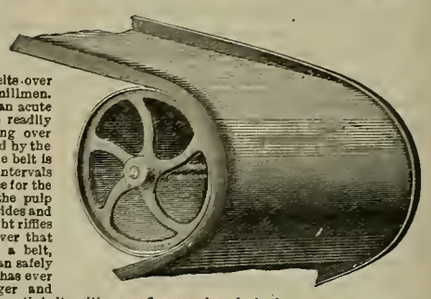

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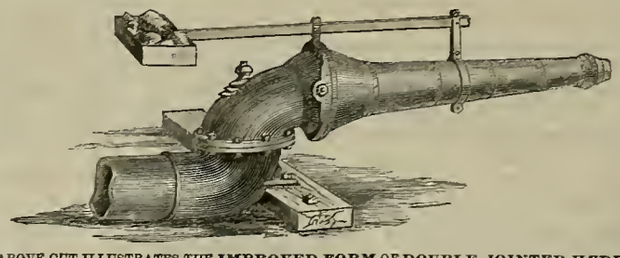

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Coast Industrial Notes.

—Tbere are nearly 300 shingle mills in Wasbington, and perhaps twice as many men wbo are owners of them.

—Tbe statement is made that the Port Blakely Mill Company logs over 2000 acres of timber land annoally to secure material to operate its saw mill at Port Blakely, Wasblngton.

—Tbe employes ln the railroad shops at Sacramento and Oakland have hegun to work six days and nine bours. They have heen woiking eight hours and four days a week for several weeks past.

—There is a rumor at Victoria, B. C., founded upon private advices, that the Governments of the Unlted States and Great Britain are negotiating to close Behring sea and the Pacific for two years.

—It is reported at Chino tbat Claus Spreckels bas hought 6000 acres of the Bixby rancb, near Westminster, Orange county, and will plant it to heets. If tbis he true, it means another sugar factory for that region.

—The directors of the Alameda, Oakland and Piedmont Electric Railway Co. have filed a certificate of the action of the stockholders at a meeting held December 15, 1892, creating a honded indehtedness of $350,000.

—Yolo county's tax rate is $1.20. It was $1.10 last year. The rate ln Napa is $1.65, 35 cents higber than in 1892. Amador's rate is the beaviest ln years, $2; San Joaquin's, $1.30; San Bernardino's. $1.83: Marln's, $1.30; and Sacramento's, $1.40.

—Work on the huildings and grounds of tbe proposed Midwinter fair at Golden Gate park has heen hegun in earnest. The transcontinental roads have agreed to a round-trip rate of $65.50 from Missouri river points to San Francisco during the Midwinter fair.

—The insnrance companies have adjusted the loss by reason of the fire at the Pacific Iron and Nail Works. The nail company fixed its loss at $80,000. A settlement was made on a hasis of $65,000. The company bas announced its intention to rehuild the works.

—All the transcontlnental lines except the Sonthern Pacific were represented at a meeting in Cbicago, Tuesday, to consider rates to California's Midwinter Fair. It was practically decided, if tbe Southern Pacific agrees, to make the ronnd trip $65, the same as now.

—In Sonoma county there will he 10,000 or 11,000 hales of hops produced this year, against 8400 last year. Tbe bops are of an excellent quality. Only white lahorers were employed and tbey were so satisfactory that Chinese will not he glven work when wbite belp can he secured.

—It has been found that the law authorlzing the issuance of $600,000 honds for the construction of a ferry depot in San Francisco is defective, hut tbe Board of Harhor Commissioners will endeavor to go ahead with tbe putting up of the union depot with the funds at its command.

—Work on the Yuha cut-off is progressing satisfactorily. Nearly 200 men are employed and over 400 horses. Buck scrapers, wheel scrapers and sllp scrapers are used, and 6000 yards of dirt are heing moved daily. Wben a deptb at which seepage water interferes is reached, steam sbovels or dredgers will have to he used.

—The Southern Paclfic Company, it is said, has concluded to raise its rates on freigbt transported between San Francisco and points across the hay hy the several express companies, the increase, so tbe story goes, heing equivalent to 25 per cent over present charges. It is also rumored tbat the creek route proposes to raise the ferriage on teams from 25 cents to 50 cents.

—The Oakland Council Water-front committee has closed negotiations with the Davie Ferry Co. and the slip and wharf for the opposition ferryboats will now probably he pushed before the winter sets in. There was some hesitation about going ahead with the work hefore the ferry company signed a contract to use it for a stipulated time at a certaln figure, hut Mr. Davie has slgned for 12 months.

—Articles of lncorporation have been filed at Los Angeles by Captain John Cross and ex-Senator Cbarles W. Cross of San Francisco, and others of Los Angeles and Pacific Railroad. Tbe capital stock will be $200,000. This is intended to be a revival of the old foothill railroad to Santa Monica, which for several years has been idle. The new company will use steam locomotives for a time, witb tbe ultimate design of operating the llne hy electricity.

—A big cigar-shaped pile raft has been made at Coos hay to he towed to San Francisco. Tbe raft is 612 feet long and contalns 3500 piles of an average length of 70 feet, and draws 16 feet of water. Considerable interest is taken in the raft, and its successful trip to San Francisco means the opening of a new enterprise on Coos hay. Captain Roberts of tbe National City has taken the contract to tow it to San Francisco and wlll take it on hls next trip, which will he some time soon.

—A lumber war is on in San Francisco. Tbe Pacific Pine Lumher Co. offers to furnish the Board of Harhor Commissioners witb Oregon pine lumher No. 1, in sizes and lengths as ordered, for $10 per tbousand, delivered, and cut the price on piles to 11 cents per foot for 12-inch piles, 12 cents per foot for 13-inch piles and 13 cents for 14-inch piles, delivered. Tbese prices the Slade Lumber Co. met, and now comes the Golden Gate Lumher Co. and offers the same lumher at $8, delivered, piles at 10 cents, 11 cents and 12 cents delivered.

—Representative Hllborn has presented to Congress a memorial asking for the opening of the western end of the tidal canal, in Oakland harbor, through the isthmus into tbe estuary of San Antonio creek, to a wldtb of 400 feet and a depth of eigbt feet helow low tlde, so that the full ebh and flow of tides may pass to and fro hetween the estuary and the extreme eastern limit of the tidal canal hasin as now constructed, to the end tbat the nuisance whicb now exists by reason of the impounding of a large hody of contamlnated and impure water, wbicb is a menace to the health of 75,000 people in said cities, may be abolished, and asking that an appropriation of $50,000 be made available at once to make tbe improvement.

—The preliminary arrangements for the consolidation of a numher of the street-car lines of this clty into one gigantic company have heen practically completed, and all that now remains to be done is to make the formal transfers of the property and perfect the details for the operation of the new corporation. The new organization will include about all the roads in the city, with the exception of the Geary and Callfornia-street lines, the Presidio and Ferries and the two electric roads. The plan for the allotment of stock in the new company will he formulated hy a company appointed for that purpose. It will he hased upon an estimate of tbe earnings of tbe varlous lines for several years hack, tbeir present boldings in rolling stock, roadhed, machinery, etc., and all other matters that would naturally enter into an estimate of the relative wortb of the corporations.

—Tbe Sacramento Electric Power and Light Co. has closed a contract with tbe General Electric Co. for furnishing material and erecting a plant for the transmission of power from their works at Folsom to Sacramento, 19 miles. It will take, however, 324 miles of copper wire of 500,000 pounds in weight. Provislon is made for cutout stations at convenient points, so that the lines may he divided into tbree sections and grounded or cross-connected, so tbat notbing short of a total prostration of tbe plant will interrupt operations. Work is to he completed wlthin 10 months. It is also provided that tbe company shall forfelt $50 per day for each day the work is incomplete. This is one of tbe most important enterprises ever brought to a head in the interior of the State. It means tbe transmission of almost nntold motive power from the great water system of Folsom to Sacramento for operating street cars, city lighting, power for factories, etc.

—Sealed proposals will he received hy tbe Board of Trustees of tbe State Normal School at Los Angeles, Cal., until 10 o'clock A. M. of Saturday, October 14, 1893, for furnishing tbe materials for and doing the work of erecting a new building for the State Normal School at Los Angeles. Bids will also be received as required hy law as follows: For tbe furnishing of the materlal for and doing the iron and mason work; for the furnishing of tbe materials for and doing tbe carpenter's and plasterer's work; for tbe furnlshing of the materials for and doing the plumbing, gas-fittlng and beating work; for tbe furnisbing of the materials for and doing tinning, galvanized iron and slating work; for tbe furnisbing of the materials for and doing the painting and graining work, and for tbe furnishing of tbe materials for and doing tbe electric work, will he separately received, and separate contracts for furnishing sucb materials and doing such works will he received and made as set out in this notice.

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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned

CALIFORNIA.

Kern.

THE BIG BLUE.—Kern coonty *Echo*: H. P. Bender has just completed an abstract of the title of the Sumner Gold and Silver Mining Company's property at Kernville. This is the property commonly known as the "Big Blue," and includes an 80-etamp mill and a mine of admitted richness. The abstract referred to covered aboot 750 closely typewritten pages and was prepared for tbe Kern County Land Company, otherwise J. B. Haggin and Lloyd Tevis. As Haggin, Mackay and Jones have been making some large mine porchases of late, and as there is a general belief that we are on the eve of a great revival of mining business on tbis coast, the facts above stated may be of eome interest in tbis county.

Lassen.

FIRST ORE SHIPMENT. — A dispatch from Amadee, Sept. 19th, says: The firet carload of ore shipped from the Cottonwood mines, in Nevada, was hanled a distance of over 100 miles by team and shipped to tbe Reno Reduction Works to-day. Several years bave been spent in prospecting these mines, and many excitements have been the result. Neither fuel nor water is available, and all the ore will be hauled across the Smoke Creek desert and sbipped by rail from Amadee. The ore is principally silver.

Mariposa.

TO BUY THE HITE.—Mariposa *Gazette*, Sept. 23: Mr. James McCaw passed throogh here last Saturday on hie way down from the mountains. Mr. McCaw has been negotiating for the Hite mine, and bad been up to make final terms with Mr. Hite. Sbould the eale be confirmed, be bas a large amonnt of machinery ready to be ebipped to the Cove, and he will at once pnt men to work on the roads, getting things in shape for a long run of work.

Mono.

MINE TO BE BOUGHT.—Bodie *Miner*, Sept. 15: The Ward mine, at Green Creek, is to be purchased by Archie Farrington for the eum of $16,000. Farrington visited the mine a short time ago, and it is known tbat he was favorably impressed with it. The recent milling of ore gave more than satisfactory results, and the bullion went $16.60 to the ounce. Tbere is no donbt but that tbe Ward mine is a valuable property, and if a etrong company should take hold of it and successfully work it, a great stimulus would be given to mining in tbat vicinity.

Nevada.

MINE LEASED.—Nevada *Transcript*: Richard Thomas has leased the old Bed Rock mine at Birchville and will proceed to work it by tbe drifting process. It is a good mine, and Mr. Thomas will soon give employment to a considerable number of idle men in that vicinity.

THE PROVIDENCE.—The *Transcript* eays it is rnmored upon what eeems to be good authority that negotiations have been going on for some time for tbe sale of the Providence mine to a big syndicate of San Francisco capitalists. Ex-Senator James G. Fair, Col. A. E. Davis, who some time ago sold the Santa Cruz narrow-gauge railroad to the Southern Pacific for $6,000,000, Col. Patrick Reddy, the well-known lawyer, and one or two other prominent meu are expected to arrive in Nevada City in a day or two for the purpose of examining the property, which is considered very valuable.

A GOON CLEANUP.—Nevada *Telegraph*: The rock bauled from the Black Bear ledge, near Rough and Ready, recently croshed at the Pennsylvania mill, yielded $4 50 per ton. The yield is considered very good hy the owners, as the ledge is of immense size. Further developmente will be made on the property.

Placer.

GOON ROCK FOUND.—Placer *Herald*: T. M. Tharp, one of the owners in the Moore quartz claim located a mile or two helow Auburn, was in town last Saturday afternoon and informed ns that their ledge, which yielded aboot $40,000 from a ehaft on it 300 feet deep, continues to show new merit with each additional development. At a depth of 100 feet they run a level in 80 feet and fonnd rich rock all tbe way. They are now running in on tbe 180-foot level and the ore is even richer than it was near the surface. All the rock is of a high grade for milling and in many places it is rich enough for specimens. On the afternoon of Saturday they uncovered a fabulously rich body of ore and took out before dinner that day at least $1000.

Plumas.

RICH STRIKE.—Truckee *Republican*: Another rich strike has been made in the Plumas-Eureka mine as Johnsville, Plumas county. This is one of the oldest mines in the State, being owned by the same company as the famous Sierra Buttes mine of Sierra City. The Plnmas-Eureka had not been paying well lately and the company intended to close down shortly for the winter. Now that another rich ledge hae been found work will probably be continned there just the same as before.

Shasta.

THE GLADSTONE.—Nevada *Telegraph*: The Gladstone mine, situated at French Gulch, in Shasta connty, has been in operation for some time. Several days ago about 60 men were let out from employment at the mine. This was done for the reason that the mine is not sufficiently opened to admit of the employment of a large force of men. It is thonght that in a few months all the men will be put to work again. The Gladstone property is owned hy the Standard Oil Company and is a very valuable piece of miuing gronnd.

GOON STRIKE. — *Courier*, Sept. 23: Whit George and John Bauder have "struck it" in dead earnest at Mnletown. They are on a seam whicb is growing bigger and promises to develop into something great.

Kirk Soalding has bonded his mine at Nigger Hill, about two miles from Shasta, to parties below. Two sbifts were set to work on the mine Friday, and it is expected that quite a force may he employed there. Hont, tbe man who negotiated the deal, went to Siskiyon county to tear down a four-stamp mill near Yreka, which will be pnt np at the miue.

Messrs. Grayson and Ewen of San Francisco are negotiating for the purchase of the Hall, Murray & Conroy mine, and several other mining men are expected np to look at mines in this vicinity.

The ten-stamp mill at the Hidden Treasure is rnnning steadily on good ore. They made a $600 clean-op the other day from a rnn of about 20 tons.

Stingy Jim informe us that the new mill is np ready for inspection. He pnt in the concentrator last week.

Conaut's five-stamp mill is crnshing ore from the old Wbeeler mine, near Whiskytown. They are taking out some very good ore. Oliver Woodward is in charge of the mill.

Siskiyou.

LUCK FOR CHINESE.—Yreka *Journal*, Sept. 20: The Chinese Company, working the Klamath river claim, adjoining the old Fort Jones claim, has been taking out exceedingly rich pay gravel this season, and will continue to take ont a great amount of gold dust nntil the winter storms compel suspension of operations. The men employed now resort to drifting as more advantageous than open cuts, as tbe bedrock or channel bottom is 60 feet below the surface of the river.

Other claims on the river have been paying very well, and would yield a still greater amount of gold but for the scarcity of help. The companies do not seem anxious to hire any persons they do not know, hence have been working ebort-handed all season, thongh employing all the white men, Chinese and half-breeds who reside in the county.

A new ten-stamp mill has just been set np at tbe Sterling mine on Sonth Fork of Hnngry creek, in the Siskiyon mountain foothills, which will be started np on 25th in crushing a lot of quartz taken out, and also a lot from J. C. Coyle's ledge adjoining.

The Greenborn blue gravel mine, a short distance south of Yreka, has been paying very well lately, with only two pickmen at work in the drift, on account of water being scarce for washing. Tbe first two riffles of eloices are cleaned up every day, and all the sluices at end of week, realizing from two to three onnces each day, and considerable more on the seventh day, the cleannp on last Sunday amounting to 7 onnces and $5. Tbere is very little water in the creek at present, the most of the supply coming from the drainage pump, wbich is saved in a large tank. As soon as the winter rains commence to furnish a better supply of water, a large force can he put at work with good enccess, as there is plenty of rich blue gravel to he taken out. Tbe company has contracted for delivery of 400 cords of wood to keep the machinery in constant operation, and expect to take out a large amount of gold during the coming winter and spring.

The Siskiyou Quicksilver Mining Co. has let contracts to run two tnnnels in their claim on the west branch of Beaver creek for finishing up assessment work, with the intention of commencing operations next spring on an extensive scale. Mr. Newcomb, one of the stockholders, has been at the mine and expects to take charge of the work next year, believing that it is a valnable location of superior cinnabar.

ON BEAVER CREEK.—A letter from Siskiyon county gives the followiug items from the mines on Beaver creek: The Patterson mine will not be started again till next season. W. T. Beagle and his son will work at the Beagle and Brunk claims all winter. W. F. Torrey and two sons are working at hie claim on Grouse creek. Wm. Hurst is prospecting a claim on Grouse creek above Torrey's. Tom Henry will work at his claim on Beaver below Henry's. Willey, who is operating a mine with giant and derrick, five miles helow the Patterson mine, has struck a richstreak, and is taking out good pay.

THE GREENHORN.—Yreka *Journal*, Sept. 27: Tbe Greenhorn blue gravel mine, about a mile south of Yreka, still continues to pay handsomely, notwithstanding the lack of water preventing the working of more than two pickmen. The cleanup last Sunday for the previous day's operations amounted to nine ounces lacking half a dollar. When the rainy season commences to furnish more water for working an additional force the amount of gold realized will be largely increased.

A man named Barnes is now crushing qnartz from his ledge on Cherry creek, at the Greenhorn and Deadwood divide, which is paying exceedingly well. He feels certain of realizing at least $3000 for his work this season.

James E. Irousides was in town last week with a large supply of bullion from his qnartz ledge on Cherry creek, which has been paying very well this eeason.

Jordan & Bro., of Humbug creek, are still husily engaged in opening their ledge lately discovered, which, thoogh only four or five inches wide, mills at least $50 or $60 to the ton, with hope of widening as the work of sinking down progresses.

A man named Rose, who has been working a fine ledge of quartz on Eddy'e gulch, in Salmon River section, has just erected a 26-stamp mill at the mine, for the purpose of crushing the ore on an extensive scale.

Judge Holcomb, of Oregon, has bonded a

quartz mine at Salmon river, near Sawyer's Bar, belonging to Dr. A. C. Helm and others, and intends placing a nnmber of men at work on same under the management of Frank Holberg.

Qnartz taken out on Greenhorn creek by the late D. McPherson, is now being hanled to the McCook mill on Hnmbng by Myron Carrick, at the request of the administrator, which it is thonght will pay well.

Browu & McDonald, who have been working a ledge on Humbng creek, had 16 tons of rock crushed lately at the McCook mill, which paid $17 to the ton.

Charley Abbott, of Greenhorn, hauled 7½ tons of qnartz from his ledge on Greenhorn creek to Hnmbng, which was crnshed in the McCook mill, realizing a handsome retnrn.

Sierra.

Corr. Downieville *Messenger*: The Nevada Drift Mining Company are building a new office and storehouse on their claim at Newark. A large supply of timbers has been laid in for drifting purposes, and the gronnd, like all on this ridge, prospects well; average, $2 to $5 a carload—23 cnbic feet of gravel. A quartz specimen weighing five pounds, recently fonnd in this mine, yielded $964.

The Niagara Consolidated drift and hydraulic mine at Hepsidam, three miles northeast of Gibsonville, owned by the late Miles Schofield, is being operated by his sons, Alfred and Miles. Good paying gravel has for years been run throngh by two main tunnels, in 4000 feet. The location compriscs 1300 acres of mining gronnd, a mile of tailing claims and 1000 inches of water, available for drifting or to hydranlic. The Shofield boys lately, in three honrs, with a rocker, washed out $9 from snrface gravel in a ravine on their claim. The property is being fitted np for thorongh development this coming winter.

H. Tahor's tnnnel is in 2400 feet, face in hard rock. He is working five men, and indications are that gravel is within 100 feet. This lead is a part of the Thistle Shaft and Feather Fork Company's Gibsonville and La Porte channel. Mr. Tabor has expended a small fortnne in the development of this valnable mining property.

Trinity.

Temporarily Shut Down.—*Journal*, Sept. 23: The Altoona quicksilver mine was closed down last week and a large nnmber of men turned off. This, it is learned, is only temporary. The reason, the parties were informed, was on acconnt of the fornace leaking, which cansed the loss of a large amount of quickeilver. The fnrnace will be torn down and another rebuilt, when the work will again be resnmed with the same large force.

Tuolumne.

Rich Find.—Tnolnmne *Independent:* David Williams has discovered a rich quartz mine above Italian Camp, on the Stanislaus river, directly opposite the Keltz mill. W. D. Bannister and A. C. Nelson are interested in the property. The latter gentleman bronght some of the rock down this week. The rock obtained from the ont-croppings is very rich. The vein ie apparent for a distance of 200 feet down the hill, and ie nniform in richness and abont one foot in thickness.

Ventura.

A Mica Mine.—Bakersfield *Californian*: J. A. Robb & Co. have opened a deposit of mica in the Pirn district which promises to be very valnable. Mr. Robb discovered the ledge last April and began work on it in June. The surface croppings were only abont an inch wide, bnt at a depth of 8 or 10 feet the ledge has widened ont so that sheets eight inches square are taken ont, and the ledge is still widening. The quality of the mica improves, too, with depth. The ledge has been nncovered for 50 feet, and Mr. Robb believes he has a bonanza, and indeed he has if it holds out. He has offers of $4 to $7 a ponnd for all the clear mica that will average four to eight in width, and apparently there is a large snpply that will come to these reqnirements.

NEVADA.

Washoe District.

On the Comstock.—In Con. Cal. & Virginia 40 tone of ore, assaying $22 per ton, were extracted dnring the week ending Sept. 16th on the 1500 level in following narrow streaks. The crosscnt running west from end of drift from end of an east crosscnt from main sonth drift, 1600 level, continues in porphyry showing streaks of qnartz of low assay value. An east crosscnt has hean advanced on same level from north drift in porphyry, clay and qnartz. Have continued necessary repairs to the drifts on sill floor of 1650 level, and from end of sonth drift from winze, 52 feet down, have extracted 421 carloads of ore—abont 416 tons. Have shipped to Morgan mill during the week 345 240-2000 tons of ore, the average assay value of which (per sample cars) was $27.42 per ton. The average assay value (per battery samples of all the ores worked at the mill during the week, 390 tons) was $24.88 per ton. Bullion now on hand in our assay office, assay valne about $13,000.

On the 1565 level of Mexican the south drift continues in soft porphyry and clay formation which carries little quartz. The east crosscnt on same level of Ophir is in a soft porphyry formation carrying a little clay. The sonth lateral drift from intermediate tunnel in Sierra Nevada has been advanced 20 feet; the face is in porphyry and bunches of quartz. West crosscnt No. 5, on 200 level of Gould & Cnrry, has been extended 17 feet throngh hard porphyry. The east crosscut on 240 level of Andes is in quartz and clay. West crosscnt No. 3, on 200 level of Best & Belcher, is passing through soft porphyry, clay and quartz.

The west crosscut from the sonth drift, 220 feet south of the shaft, 850 level of Potosi, is ont 49 feet; face in porphyry. The sonth drift on the sixteenth floor above the 930 level was advanced 19 feet during the week; total length, 55 feet; face in porphyry and streaks of quartz that gives fair assays. Extracted and sent to the mill the past week 347 750-2000 tons of ore from the 1000 and 1100 levels. Milled dnring the week 348 tons; on hand at mill 92 200-2000 tons. Average battery assays, $19.91; average car-sample assays $22.07.

Have completed repairs to the west drift, 250 level of Chollar, and are now making some repairs to the west drift on the 100 level and the main incline below the 930 level. The west crosscnt from the north drift, 930 level, is ont 62 feet; face in porphyry. The new winze below 1300 level of Hale & Norcross is down 23 feet, and continues in good ore. Are now working east in ore from bottom of winze four sqnare sets. Have extracted from the winze the past week 41 cars of ore; average assay valne per car sample, $35.30 per ton.

Summary of Comstock Operations.—Last week was a favorable one at the Con. California and Virginia mine. The shipments of ore to the Morgan mill amonnted to 513 tons, and were the largest in many weeks. The average car-sample assay of this ore was $32.90 per ton. The amount of ore milled was 429 tons, and the average battery-sample assay was $28.66 per ton. Dnring the week bullion valned at $13,-354.41 was shipped to the Carson Mint. Of the ore yield of the past week 44 tons was extracted from the openings 75 feet above the sill floor of the 1500-foot level, and the averge of the same was $30 per ton—the highest yet. Good ore continues to be fonnd in the various openings 52 feet below the 1650 level. In the Ophir mine they have snspended work in the east crosscnt from the main south drift on the 1565 level, and are removing the air-pipe, car track, etc., from that point. Repairs to the Ophir main shaft, jointly with the Mexican Company, continne to be made. On the 1565 level of the Mexican mine the south drift from the east crosscnt from the main north drift continnes to follow a qnartz prospect which yields low assaye. On the 900 level of the Union shaft the joint north drift from the Union Con. and Sierra Nevada west drift started at a point 1520 feet west of the shaft, is in 156 feet, and the face is in porphyry, clay and qnartz giving low assays. No changes in the condition of the Andes, Best & Belcher or Gonld & Cnrry minee are reported.

In the Chollar mine they have started a drift on the 100-foot level at a point 145 feet north of the Potosi line to explore the npper ground. In the Potosi mine they have started an npraise from the south drift on the sixteenth floor above the 930 level and advanced 16 feet; top in porphyry and bnnches of quartz that give fair assays. The north drift 28 feet below the 1000 level is ont 33 feet; face in porphyry and low-grade qnartz. Extracted and sent to the mill the past week 206 tons and 1000 ponnds of ore from the 1000 and 1100 levels. Milled dnring the week 151 tons. On hand at mill, 147 tons and 1200 pounds. Average battery assays, $20.73; average car-sample assays, $35.32.

In the Hale & Norcross mine on the 1300 level they have finished pntting the sqnare sets of timbers in the new winze and drifted east from bottom of winze seven feet. The bottom of winze shows a width of about eleven feet of ore, and the face of the east drift shows a mixture of ore and porphyry. Have extracted from the winze the past week 17 cars of ore, average assay valne per car samples $30.50 per ton. At the Ward shaft, the west drift on the 820 level is in 168 feet, the face being in hard porphyry. At the Occidental Con. they continue to extract from the west ledge, above the 400 level, from two to three tons of ore per day of the average value, as per car samples, of $39.40 per ton. The west crosscnt from No. 2 npraise, started at a point 75 feet below the 200 level, is in 24 feet; face of porphyry with streaks of qnartz. In the Kentuck Con. mine from the south lateral drift in the east ledge they have started a west crosscnt which is now in ten feet; face in porphyry and quartz. In the west ledge they have raised two sets of timbers for chnte way.

Kennedy District.

Kennedy District Mill. — Reese River *Reveille*, Sept. 20: W. T. Jenkins has the Rock creek quartz mill torn down and enroute to Kennedy district, where he will erect and operate it on Kennedy ore.

Mrs. L. D. Huntsman owns a very promieing mine in Kennedy. Mark Wiggin and Ed Stone also have good claims there.

ARIZONA.

More Stamp-Mills.—Phœnix *Herald*: The starting of the Morgan City stamp-mill is an indication of prosperity in this section of Arizona. The Harcuvar Company has been spending from $3000 to $4000 a month in this town. There will be another stamp-mill in operatiou in the early part of November, this one in the Cave Creek district by the Phœnix Mining Co.; that company has been distributing $10,000 or $12,000 a month. The Mammoth mill at Snperstition will be in operation thie week. While the distribution of money from that enterprise does not at all reach Phœnix, it stays in Maricopa conuty, and the neighbor sisters, Tempe and Mesa, are the gainers.

Mining Notes.—Kingman *Miner*, Sept. 23: O'Dea & Co. have some splendid ore on the dnmp of their shaft on the Prosperity mine.

The Senator company is sinking for water on the river bank near their gold mine. It is now thought that an abundance of water will be secured by the middle of next week.

T. B. Lyons had four tons of ore from the Prince Albert mine, White Hills, worked at the Kingman sampler this week. The ore was as rich as any prodnced by that property in many months.

The sampler is now buying ore and paying cash in fnll. This is a great convenience to shippers as compared with the rates offered by most of the Eastern smelters, who only pay part cash and the balance in 30 to 45 days, or else limit the amonnt of silver that the ore mnst contain to be accepted by them.

Charles E. Sherman has jnst had several tons of ore from the Distaff mine at Chloride, worked at the sampler. The ore is rich in silver and will net a large sum of money. Mr. Sherman will eoon resume work on his property, as it is too valnable to remain idle for any length of time.

U. S. Jackson, Mix Bros. and Dick Cleve have their tunnel on the Grey Eagle mine, Wallapai monntains, in 180 feet. They are having ore packed down to the road and will have it hanled to the sampler in a few days.

Ike Conkey came in from the Lady Bug mine, near Mineral Park, yesterday evening. He saye that the main shaft of the mine has caved from top to bottom, completely shutting off fnrther exploitation in that part of the mine.

Walter Scott is working on his gold claims, of which he has qnite a nnmber in the Chimeheueva mountains. The ledges are large and contain paying qnantities of copper and gold. Mr. Scott has spent a great deal of money and mnch work to put his mines in condition for the extraction of ore and to show to parties who may desire to invest in this kind of property.

An assessment of 50 cents a share has been levied on the stock of the Arnold mining company. There are 100,000 shares of stock in the company and if the assessment is fnlly paid up $50,000 will be turned into the company's treasnry with which to pay off the several judgments against the concern, and also to commence operations on their valuable property in Cedar valley.

John Jamison, James Dnndon and Ike Hnnt have commenced work on the gold claim in Layne Springs and will soon have a carload of ore ready for the sampler. They have 15 inches of five-onnce gold ore to commence work on and already have five tons on the dnmp. This is one of the best little mines in the conuty, having yielded more good ore for the amonnt of work done than any other property in Arizona.

Robert Clark, one of the old-time miners of this county, and James Daily, have jnst had worked at the sampler four tons of Ivanpah ore. The ore netted between one and two thonsand dollars.

A Nugget Worth Having.—Cor. San Francisco *Bulletin*: On the north side of the Dos Cabezos mountains, in Cochise conuty, A. T., there is a canyon where considerable gold washing with sluices and "toms" has been done for ten or twelve years. Owing to the drought, little has been attempted for several seasons, bnt recent rains having made water plentiful, work was resumed. Some weeks ago the eyes of several Mexicans were gladdened by the sight of a splendid nugget, which weighed twenty-six onnces. Its breadth proved to be 3½ to 4 inches and its thickness 2 inches. A emooth solid nodule without any qnartz or waste, its rich yellow color would have made it slightly attractive even to a free silver-coinage man. At the Dos Cahezos village store it was considered by all who saw it as a fine specimen. It was good for a credit of something like $450.

BRITISH COLUMBIA.

Valuable Quartz Finds.—A dispatch from Victoria says that Government Assayer Carmichael has made a report to the Minister of Mines of a visit and investigation into the gold quartz mines discovered in the Alberni district, on the east coast of Vanconver island. His report fnlly confirms the news received of rich finds. Only one ledge had been developed to any extent, bnt the surface samples from the ledges located 20 miles distant in the same gronp of mountains were thickly incrnsted with gold. Assayer Carmichael thinks the snrronnding hills offer great inducements. The district is one day's journey from Victoria by water or rail and wagon road.

IDAHO.

Aoain at Work.—Wardner *News*: Mr. Bradley, manager of the Bunker Hill and Sullivan mines, says there are 65 men now at work for the company. The mill and tramway are in perfect condition and ready to run. The mine is in excellent shape, every stope is ready for its fnll quota of men, and the company is prepared to pnt on miners as fast as they apply. Under present conditions $3 per day is all they can afford to pay.

A Goon Statement.—De Lamar *Nugget:* Following ie a synopsis of the manager's report to the De Lamar Co. for the month of Angnst, 1893:

Tons crushed	3,203.26
Gold prodnced	$45,942 79
Silver "	33,384 90
Total	$79,327 69
Ore shipments	5,000 00
Other sources	1,909 03
Grand total	$86,236 72
Expenses of all descriptions	37,340 20
Estimated profit	$48,896 52

The Fay Templeton.—Murray *Sun*: The board, being re-organized for working purposes, leased the mine and mill to the Ward Bros., who are to pay the company $1 a ton for every ton of qnartz milled. The lease runs for a year, and the lessees think they can crush 9000 tons dnriug that time. Work has already begun to start up the plant. The history of the Fay Templeton is as checkered as that of the Idaho. The richness of the qnartz first found in the mine turned the heads of some of the owners, a company was organized with an avalanche of shares and every step of progress was marked by bad judgment and incompetency. All this resulted in the suicide of the promoter, Mr. Farmer. It has been satisfactorily demonetrated by spasmodic operations that the Fay will pay to work. The suspension for the past three years has been due to nnfortunate and violent fends among the directors and stockholders, and the general public has, in the main, heen the principal snfferer.

OREGON.

Blue Rivee Mines.—Eugene *Register*: Mr. S. C. Smith brings very encouraging reports concerning the work thst is going on in Blne River camp. Late prospects from the Cyclone and Dnrango claims are as fine as any that have ever heen seen. At a depth of 50 feet on the Durango the drillings were panned ont and showed a very fine prospect. The work on the road is progressing very favorably, and will be finished in about three weeks. Nine men are at work on the road. The Oregon City Company are doing considerable work on their claim and making preparations for the mill, which will be pnt in either this fall or next spring. The development of the mines depends largely upon the mill and the road, and there is no doubt now abont these.

To Work Cinnabar Mines.—Ashland *Tidings*, Sept. 23: The company which owns the cinnabar property at Cinnabar springs, 40 miles from Jacksonville by road and trsil, is preparing to do this fall and winter the $1300 worth of assessment work reqnired npon the 13 claims. B. M. Newcomb, snperintendent of the Napa Consolidated Qnicksilver Mining Co., owns a controlling interest in these cinnabar mines. Mr. Newcomb visited the property last week, spent two days looking it over, and was mnch plessed with the prospect in sight. He ordered contracts let for two tunnels—one of 200 and one of 300 feet in length. Wm. Patterson and J. W. Briner were on the gronnd with Mr. Newcomb and snbmitted a bid for the tunnel work. They have not yet been awarded the contract, bnt it will probably be given to them. J. C. McCnlly, who has been in charge of the mines for the past year or two, will superintend the work. Mr. Newcomb believes the mines will pay well. The mines which he is superintending near Napa, Cal., are now turning ont abont 800 flasks of qnicksilver per month.

Hill & Stevens, who have an extension of the Homestake mine claim near Woodville, struck the ledge with their prospect tunnel last Saturday, and found it more than 2½ feet wide.

Snpt. Drew, of the Hammersly mine on Jnmp-off-Joe, is greatly elated by the prospects since the mill started, and reporte that he has the pnrchase price of the mine ($40,000) in sight. Over $2600 was put on the dump in one day of last week from the prospect shaft.

Nickel Mine.—Riddle *Enterprise*: Dr. B. Mobr, the expert sent to make a report of the Nickel mines, hy the English syndicate, arrived at this place direct from London on Wednesday, and, in company with Will Q. Brown, proceeded at once to the Nickel mines to make an analysis of the ore. But little time was occupied by the expert in the analysis, and his report will no donbt consnmmate the sale.

White Swan Gold.—Baker City *Democrat*, Sept. 20: The White Swan mine is in again with a neat product for September. The cleannp was brought in yesterday and left at the Baker City National Bank. The bullion is valued at $3500, and is a yield of abont $200 per day with a ten-stamp mill.

Bullion Shipment.—Baker City *Democrat*, Sept. 18: The outpour of gold from the mines of Baker and Grant counties continnes, and it is safe to say that with the close of 1893 the yield will have been the largest ever recorded in the history of these counties. Again yesterday the First National Bank of this city made a shipment of gold bullion to the Mint.

The amount was about $7000 and is the output of several placer mines in close proximity to Baker City.

The Sproule & Sloan claim, better known as the Canyon Creek diggings, Grant conuty, contribnted 220 ounces, and the Carpenter placers at Pocohontas, and other claims, the balance of this neat shipment of the precious metal.

Goon Cleanup.—Baker City *Democrat*, Sept. 11: The Baisley-Elkhorn eent in another neat cleannp yesterday amounting to about $3000, which was left at the First National Bank for shipment to the mint. The prodnct is only a partial ontput for the past 30 days.

Thne far this season a large amount of gold dnst from the placer mines hae been brought to tbis city, generally partial cleannps, the final cleaning np for the year occurring later, or when the water supply begins to fail.

Yesterday Wm. Boswell, who with his father, W. S. Boswell, is operating placer mines on Bull Run, a tributary of the sonth fork of Burnt river, brought to this city $1000 in gold dnst and deposited the same at the First National Bank.

The latest news from Robinsonville ie to the effect that a body of ore has been uncovered in the Pyx mine that gives returns np in the thonsands of dollare to the ton. The Pyx mine is owned by Messrs. Cal Berry and Chas. Collier and is under bond to Mr. McKenzie and others of Montana, who recently put up hoisting works and are developing the property in a scientific manuer.

Making a Record. — Baker City *Democrat*, Sept. 23: The Red Jacket mine at Cornncopia, owned by the Oregon Gold Company, is at last making a record for itself. Its yield for the past two months reaches nearly the $20,000 mark and still continnes. Only a few days ago the *Democrat* mentioned the shipment of $8000 in bullion to Louisville, Kentncky, where the head office of the company is located, and now comes another ontpnt. Yesterday there arrived bullion to the amonnt of $3000 at the First National Bank in this city for ehipment to the mint.

Notes.—Jacksonville *Times*, Sept. 22: Ed Schieffelin, the well-known discoverer, is taking ont eome fine ore from the Little Bunknm ledge in Foots Creek district.

Lindley & Co., proprietors of the Lucky Bart

ledge in Sardine Creek district, have put in a mill and are crushing ore. A good report may be expected from that mine in the near future.

Drew & Co., who purchased the Hammersly ledge in Jnmp-off-Joe district, have their mill in operation and are crushing first-class ore. The mine is getting better as development progresses.

Prof. Moury informs us that he is arranging a big scheme in Elliott Creek district which promises good results. In company with C. A. Fuher and J. Weill of Portland, he has located several placer claims.

The Bohemia gold mines are attracting considerable attention, and from the showing they are making; it promises to be an important camp. There has been over $8500 worth of bullion shipped from Cottage Grove this season, besides several tons of concentrates, which increased the output to at least $10,000. Aboot 100 men are in camp, and the ledges that are being worked are showing np well.

WASHINGTON.

KETTLE RIVER PLACERS.—F. H. Oliver, in a special to the Spokane *Review* of Sept. 21st, says that reports have been received at Marcus, Wash., confirming rumors of a great placer find on Kettle river, above Boundary creek. The discovery was made almost by accident, from the Chinamen who have been working in there for the past month, and hot for the fact of their becoming excited, they would still have the field to themselves. Saturdav two Chinamen came down to Boundary Falls and had $2000 worth of gold exchanged for currency, and immediately started for Victoria, with the intention of bringing back enough Chinamen to locate the bar before it was known what they had found. The bar extends from the mouth of a small creek down the Kettle river for several miles, and the gold is supposed to come from this creek, which has never been prospected on accoont of its being in a conntry whinh it is almost impossible to penetrate.

ORE MILL RONNING.—Ellensburg *Localizer*: There is but one quartz mill now in operation in the county and perhaps in the State as well, and that is the Blewett mill on the Peshastin, which is running night and day, working three eight-hour shifts. The pay roll of this mill the last month was $6400. This camp in time will be a bnsy one. There is plenty of high-grade ore, but the parties owning the mines are too poor to get the stamps, which takes money these days.

UTAH.

AOAIN AT WORK.—Park City *Record*, Sept. 23: The Silver King mine is again in operation, work being resnmed yesterday afternoon at three o'clock with a force of ahout 75 men. The rnn, while practically an experiment, will last at least three months, as contracts have been made for ore that will require fully that length of time to fill. Supt. Kearns says that the preference for work has been given to men who have families to support and are fixtures in the camp, though enongh single men, old employes of the mine, have been put on to warrant the opening of the company boardinghonse. Underground wages will be the old scale, bnt top men have been cut down a few cents per diem. Whether the mine will rnn or not after the present contract has been filled, Mr. Kearns does not know, bnt the chances that it will, from the present outlook, are rather doubtful, and certainly not of a natnre to cause an influx of miners to this camp. If the tariff is taken from lead it will knock them ont in short order with silver at its present figure, as it would make a difference to them of over $11 to the ton. When the King shut down the ore hins were full of rock, and hauling to the sampling mill has already commenced.

Arrangements are being made to start np the Anchor mine, judging from the fact that the concentrator is being repaired and placed in order, and from what meagre information can he gathered from officials.

The fntnre of the Crescent is still in donht, and, while the concentrator is heing placed in order for a full rnn, there is mnch nncertainty as to whether it will start or not. It all depends on what terms Manager McGregor makes in reference to the sale of ores. The tramway will he started np and snpplies for the winter, soch as fuel, timber, provisions, etc., taken to the mine. A force of men will be put to work in the Alliance tunnel ahont the 1st of October, and the work of driving the same into Crescent territory commenced in earnest.

Weight of an Eagle.

Said C. K. Stout of the treasury office, as he sat hefore the scales with $8000 or $10,000 in double eagles at his elhow: "How many $1 hills do you think it would take to weigh as much as one of these coins?"

The reporter considered a moment and made a guess.

It takes just 27, unless the hills are trimmed close. Twenty-eight new $1 hills always weigh a little more than a douhle eagle. Don't you helleve it? Just wait."

He disappeared in the vault for a few minutes, aod presently emerged with a package of hrand new $1 hills in his hand. Then he counted out 27 of them and sald to the reporter, "Choose any coin you will."

The reporter chose a coin which Mr. Stout put on one of the scale pans. Then he put the 27 $1 hills on the other pan. The long needle that moves on the iodex showed that the beam was almost level. The man of money added another bill to the 27, and the coln went up.—Cincinnati Commercial Gazette.

Market Reports.

The Markets.

SAN FRANCISCO, Sept. 28, 1893.

The silver market has shown no new conditions during the week, and there has been very slight variation in quotations. Congress seems no nearer a termination of the discussion of the repeal measure than before, and meanwhile the market is in suspense. Reports from the silver-producing districts are to the effect that silver mines are starting up, generally on a basis of reduced wages and number of laborers. The Cœur d'Alene mines have been encouraged to start by the recent small advance in lead. It is stated that the mines can be operated at a profit when lead is not below $3.70. At Leadville, Colo., arrangements are being made to begin operations, and similar reports are received from other places.

Silver and the Metals.

NEW YORK, Sept. 28.—Following are the closing prices for the week:

	Silver in—				
	London.	N. Y.	Copper.	Lead.	Tin.
Thursday	34	73¼	9 75	3 80	20 80
Friday	33⅞	73⅛	....	....	.....
Saturday	33⅞	73⅛	9 80	....	.....
Monday	33⅞	73⅛	9 62½	3 90	20 50
Tuesday	34⅛	73⅞	9 70	3 65	20 95
Wednesday	34⅛	74	9 70	3 70	21 00

San Francisco Metal and Coal Market.

ANTIMONY.			QUICKSILVER.		
Per lb	— @	13	Home trade, pr. flask	40 50 @	41 00
BORAX.			STEEL.		
Refined, in car lots	— @	7¾	English, lb	— @	18
Powdered, do	— @	7¾	Canton tool	— @	8¼
Concentrat'd, do	— @	6¾	All grades jobbing at advance.		
COPPER.			Bl'k Diam'd tool	8¼@	15
Bolt	23 @	—	Pick & Hammer	6¼@	10
Sheathing	23 @	—	Machinery	4 @	6
Ingot, jobbing	— @	20	Toe Calks	— @	4½
Do, wholesale	15 @	16	PIG TIN.		
IRON.			Spot ₱ lb	21½@	22
Bar, base	— @	2½	COAL.		
Norway, base	— @	4½	SPOT FROM YARD—PER TON.		
PIG IRON.			Wellington	$8 00	
	Spot.		Greta	7 50	
Eglinton ₱ ton	—@—		Nanaimo	6 50	
Glengarnock	27 00@—		Gilman	6 00	
Am. Soft, No. 1	25 00@—		Seattle	8 50	
Shotts No 1	27 00@—		Coos Bay	6 50	
Puget Sound	—@—		Cannel	9 00	
Clay Lane White	30 00@—		Egg, hard	12 00	
Langloan	27 00@—		Wallsend	7 25	
Gartsherrie	27 00@—		Scotch Splint	8 00	
Barrow	—@—		Brymbo	7 50	
Cargo Scotch	—@—		West Hartley	7 50	
LEAD.			TO LOAD—PER TON.		
Pig	— @	4½	Australian	5 50@—	
Bar	— @	5	Liverpool Steam	6 87@—	
Sheet	— @	5	Scotch Splint	7 00@—	
Pipe	— @	5½	Cardiff	7 00@—	
			Lehigh Lump	10 00@—	
			Cumberland	8 50@—	
Drop, sizes *smaller* than B, ₱ bag of 25 lbs		$1 75	Egg, hard	9 00@—	
Do do, B and *larger* sizes ₱ bag of 25 lbs		2 00	West Hartley	7 50@—	
Buck, Balls and Chilled do, ₱ bag of 25 lbs		2 00	COKE.		
			English, to load	$9 50@10	00
			Do, spot, in bulk	—@12	00
			Do, in sacks	—@14	00
			Cumberland	9 50@—	

The Stock Market.

SAN FRANCISCO, Sept. 28, 1893.

The Comstock market has been very dull during the week, and sales have been much restricted. The prospective settlement of the wage question does not seem to have had much effect for the better. The Crown Point Mining Company levied another assessment, and it did not help matters. There are rumors that other assessments will soon be levied.

At the delinquent sales of the Ophir and Sierra Nevada Mining Companies the other day less than 2500 shares of each were sold for non-payment of the assessments. These shares were bought by outsiders, and neither company has a share in its treasury. The Sierra Nevada Company has a fat bank account of ahout $18,000, hut the Ophir Company is not so well off, and may ere long come in for another assessment.

The Gold Hill Miners' Union has re-voted on the question of wage reduclion and decided to accept 50 cents less by a vole of 107 to 37. The Mechanics' Union has also decided to reduce hy a vote of 74 to 16.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING SEPT. 12, 1893.

505,017—STOVE SHELVING—F. A. Anthony, Livermore, Cal.

504,859—AMALGAMATING PAN—M. P. Boss, S. F.

504,966—SPRINKLER—Caton & Warring, San Jose, Cal.

504,804—REFRIGERATOR—O. H. Fox, Delano, Cal.

504,973—SAND-HOLDER—J. H. Grinwold, Oakland, Cal.

504,922—PUMP—W. A. Hartt, Tucson, A. T.

505,044—ILLUMINATING TILE—H. Haustleo, S. F.

504,924—METALLIC TIE—P. H. Jackson, S. F.

504,928—PULLEY BLOCK—C. Matheson, Eureka, Cal.

504,995—SOLE AND HEEL PLATE—J. I. E. Nelson, Cedar Home, Wash.

505,002—ALMOND HULLER—W. G. Read, Colusa, Cal.

504,949—HEADLIGHT COVER—F. A. Stevens, Sacramento, Cal.

504,952—WINDOW SHADE—S. T. Stuver, Puyallup, Wash.

504,895—BUCKLE—F. W. Swigart, Arroyo Grande, Cal.

504,955—FLASHLIGHT CHARGER, ETC—S. M. Williams, S. F.

505,014—FLASHLIGHT BURNER—S. M. Williams, S. F.

504,956—FLASHLIGHT BURNER—S. M. Williams, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

MEANS FOR UTILIZING THE WASTE PRODUCTS OF PETROLEUM.—Jacob P. Engle, S. F. No. 505,395. Dated Sept. 19, 1893. The object of this invention is to provide an apparatus by which those waste prodoots of petroleom which are mixed with water and of nearly the same specific gravity may be separated from the water. It consists of a furnace with mains of iron or iron hars laid within it, and jet pipes through which the petroleum waste and steam are injected into the fornace, where combustion takes placc.

CLUTCH MECHANISM.—Isaac F. Thompson, S. F. No. 505,257. Dated Sept. 19, 1893. This invention consists of a clotch mechanism in which the driving portion is connected with or disconnected from the part to he driven hy intermediate clamping jaws which are caosed to grip a flange, or to be loosened from it hy a pecoliar arrangement of levers, actnated from a collar slidable npon the shaft.

FREE ENOINE HAENESS.—Thomas Mnrphy, S. F. No. 505,410. Dated Sept. 19, 1893. This invention relates to improvements in harness nsed in connection with fire engines and apparatns, and it consists of antomatically operating devices hy which the harnesses are secnred npon the horses at the instant the latter place themselves by the pole, and the machine is ready to start at once.

SCEEW PROPELLEB.—A. D. Hall and Geo. B. Sloan, S. F. No. 505,402. Dated Sept. 19, 1893. This invention has for its object snoh improvements in screw propellers as will greatly increase their power and the consequent speed of the vessel to which they are attached. It consists of opposing blades, each forming about one-half a tnrn abont the shaft and exterior peripheral flanges, the action of the whole heing snch as to concentrate the action of the propeller into a line with the direction of travel and halance it at high speed.

STAMP STEM GUINE.—Hugh P. Grngin, Helena, Montana. No. 505,400. Dated Sept. 19, 1893. This device consists of a socketed stock throngh which the stamp stem passes. Within the stock are open-ended, longitndinally-disposed channels, opening into the central socket. Balls are seated and freely move in these channels and hear on the stem, and removable stops at the channel ends permit the insertion and removal of the balls. By the ose of this gnide mnch wear and tear is avoided and friction is redneed to a minimnm.

TYPEWEITINO MACHINE KEY CUSHION.—Robt. S. Graham and Wm. B. Savell, S. F. No. 504,065. Dated Aug. 29, 1893. This invention relates to attachments for the keys of typewriting and other machines which are operated by the fingers, and is designed to protect the fingers of the operator from the results of the continued blows to which they are subjected dnring the day. It consists of covers which may he easily attached to the keys of such machines as they are applicable to, and these covers are made hollow and elastic, to provide a soft snrface for the fingers to strike upon. Each cover is formed with the character of the key beneath indicated thereon, either in raised, colored or other forms.

The Noisiest Animals.

What animal can make the most noise? The elephant. During the hreeding season in the forests of India and Ceylon the trumpeting and roaring of the animals is continuons and terrific, and can he heard for miles. The fellne family are wont to scare their prey thoroughly hy their overpowering noise. Thus the roar of the adult lion is terrific, the windpipe heing enlarged so as to give the animal a larger volume of air, proportionately, than any other animal. The male gorilla has an awful, loud-sounding voice. When attacked it utters a short, jerking, acute hark, like that of an angry dog. To this sncceeds a low growling, which might be mistaken for distant thunder.—Baltimore American.

Welsh Americans.

The Welsh in the United States claim that they are in number as many as their countrymen in Wales, and they also claim that one of their ancestors forestalled Columhus in the discovery of America hy 272 years. They base their assertions on historical traditions and the manuscripts of old Welsh bards on the one hand, and on the prevalence of Welsh in many of the languages of the Indians, hoth of South and North America, on the other.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F JOURNALS.

ASSESSMENTS.

COMPANY AND LOCATION.	No.	AMT.	LEVIED.	DELINQ'T AND SALE.	SECRETARY.
Amador G Mine, Cal	1	5c	Sept 7,	Oct 12, Nov 7	F E Luty, 330 Pine
Arnold G and S M Co, Ariz	5	50c	Sept 19,	Oct 23, Nov 3	A Judson, 320 Sansome
Bay State M & Dev Co, California	16	2c	Aug 30,	Sept 23, Oct 25	A J Coster, Plymouth, Cal
Bodie Cons M Co, Cal	16	15c	July 24,	Sept 25, Oct 24	M E Willis, 309 Montgomery
Bodie Tunnel & M Co, Cal	17	10c	Sept 5,	Oct 7, Oct 24	Chas C Harvey, 309 Montgomery
Brunswick Cons G M Co, California	6	2c	Sept 4,	Oct 6, Oct 24	J Stadtfeld, 56 Nevada Block
Caledonia G M Co, South Dakota	17	50c	Sept 13,	Oct 16, Nov 16	F G Drum, Mills Building
Olinton M Co, Cal	2	15c	Aug 9,	Sept 16, Oct 2	O E Gunn, Mills Bldg
Confidence S M Co, Nevada	23	25c	Aug 7,	Sept 11, Oct 2	A S Groth, 414 California
Cons New York M Co, Nevada	11	5c	Sept 27,	Nov 1, Nov 22	Chas E Elliott, Nevada Block
Crown Point G & S M Co, Nevada	52	10c	Sept 25,	Oct 31, Nov 21	James Newland, Mills Building
Do a Gold Mining Co, Cal	1	5c	Aug 25,	Sept 25, Oct 25	Chas J Blumenthal, 415 Montgom'y
Gray Eagle M Co, California	33	3c	July 10,	Sept 6, Oct 4	Chas O Harvey, 309 Montgomery
Herold M & M Co., California	6	11c	Aug 10,	Sept 16, Oct 3	M E Willis, 309 Montgomery
Inyo Marble Co, Cal	21	5c	Aug 8,	Sept 12, Oct 12	W W Sargeant, Mills Bldg
Jackrabbit M Co, Cal	4	5c	Aug 10,	Sept 15, Oct 6	Thos Wetzel, 320 Sansome
Martin White M Co, Nevada	23	25c	Aug 31,	Oct 26, Dec 14	K L Ross, 120 Sutter
Orleans M Co, Cal	13	82	Aug 29,	Oct 9, Oct 31	Geo P Thurston, 575 Mission
Overman S M Co, Nevada	68	5c	Sept 1,	Oct 5, Oct 26	Geo D Edwards, 414 California
Potosi M Co, Nev	39	25c	Sept 13,	Oct 16, Nov 7	Chas E Elliott, 309 Montgomery
Skidoo Cons Quicksilver M Co, Cal	7	1c	Aug 24,	Oct 5, Oct 27	Edw F Stone, 306 Pine
Spiraksoff S M & M Co, California	10	1c	Aug 18,	Sept 23, Oct 19	W J Gurnett, 308 Pine
Utah Cons M Co, Nevada	19	5c	Sept 1,	Oct 4, Oct 25	A W Havens, 309 Montgomery
Valenzuela Cons M & L Co	2	1c	Sept 20,	Oct 23, Nov 10	A Everett Ball, 431 California
Yellow Jacket M Co, Nev	55	25c	July 29,	Sept 5, Oct 9	W H Blanvelt, Mills Bldg

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE
Hale & Norcross S M Co, Nevada	Special	A B Thompson	Oct 12
Presidio M Co	Annual	L Osborn	Oct 2
San Vacente M Co	Annual	A H Ricketts	Oct 3

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, September 28, 1893.

9:30 A. M. SESSION.

100	B & B	45c	200 Con Sence 50c
50		40c	100 Gould & Curry 20c
200	Bullion	10c	400 Justice 10c
100	Challar	20c	350 Potosi 25c
50	Con. Cal. & Va	1.25	20 Sierra Nevada 40c

2:30 P. M. SESSION.

150	Alta	10c	300 Crown Point 15o
50	Belcher	25c	100 Mexican 50c
180	Challar	15c	400 Overman 5c
50	C. Con. & Va	1.25	50 Union 25c
100	Confidence	45c	700 Yellow Jacket 40c

Pacific Stock Exchange.

9 AND 10:15 A. M. SESSIONS.

200	Belcher	27c	500 Ophir 76c
100		28c	200 75c
100	B & B	43c	500 74c
100	Bullion	12c	100 Potosi 25c
550	Con. Cal. & Va	1.25	550 24c
400	Confidence	50c	100 Overman 5c
100	G & C	17c	100 Sierra Nevada 42c
50		20c	50 40c
400	H & N	37c	300 Untou 25c
600		35c	100 Utah 2c
100	Julia	1c	100 Y Jacket 42c

2 P. M. SESSION.

900	Kentuck	3c	100 S Nev 40c
100	Mexican	51c	600 Union 25c

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Or none at all. To secure the best patents Inventors have only to address DEWEY & Co., Pioneer Patent Agents, No. 220 Market St., San Francisco.

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Conducted from 1863 by its present owners (A. T. Dewey, W. B. Ewer and Geo. H. Strong) this agency has the best knowledge of patents already issued, and of the state of the arts in all lines of inventions most common on this coast.

Patents secured in the United States, Canada, Mexico, all British colonies and provinces, England and other civilized countries throughout the globe.

Caveats filed, assignments duly prepared, examinations made, and a general Patent Agency business conducted.

Established and successfully and popularly conducted for nearly thirty years, our patrons number many thousands, to whom we refer with confidence, as men of influence and reliability. Old and new inventors are cordially offered the complimentary use of our library and free advice, etc. No other agency can afford Pacific States inventors half the advantages possessed by this old, well-tried and experienced firm.

Cal. Debris Commission Notices.

NOTIOE.—The California Debris Commission, duly appointed under the Act of Congress of March 1, 1893, having received a petition from Louis Conrath, attorney in fact for the Excelsior Water and Mining Company, for permission to mine by the hydraulic process in the Blue Gravel Placer mine, near Smartsville, Nevada County, California, and to deposit tailings in an old hydraulic pit, hereby gives notice to all concerned that a hearing will he held at the office of the Commission, room 92, Flood Building, San Francisco, on October 17, 1893, at 1:30 o'clock P. M. On and before this hour and date all parties interested may file affidavits, plans, and maps, in support of their respective claims. By order of the Commission: W. H. Heuer, Major, Corps of Engineers, U. S. A., Secretary.

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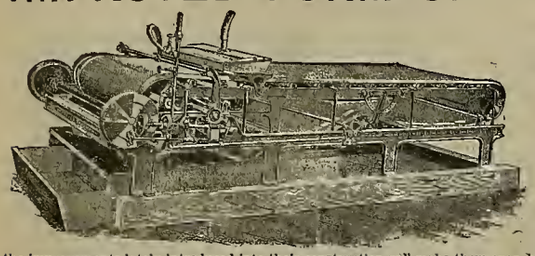

The annexed cut illustrates the **"TRIUMPH" CONCENTRATORS**, and shows the recent improvements which have been introduced into their construction, by which many advantages are gained over any other form of Vanners, Vanning Machines or Concentrators.

These advantages are obtained by reason of the fact, as will be observed, that the crank-shaft is now placed and fitted at the head of the Concentrator, clear of the belt and in direct view of the operator or attendant. This, of course, greatly facilitates the oiling of the bearings of the shaft and connecting rod and precludes the possibility of any sand or detritus, passing over the belt, from reaching or getting into the bearings.

The forms of the bearings and as well of the connecting-rod brasses have also been very much improved, making them stronger, simpler and more easy of adjustment. Important changes have also been made in the feed screw and quadrant for regulating the belt, with the view of making all parts of the machine stronger, more accessible and as easy of regulation as is possible.

We furnish the "TRIUMPH" Concentrators with either the plain or "Blasdel" Rifled Belt and shall be pleased to quote prices with the adaptation of either, as may be requested, and shall further be pleased to show one of the improved form, set up ready for operation, at our office.

REDDING, CAL., April 22, 1893.

Joshua Hendy Machine Works, No. 51 Fremont St., San Francisco, Cal.—Gentlemen:—Following the testimonial letter which I addressed to you December 9th, 1890, in relation to the superiority of the "Triumph" Concentrators over either the "Frue" Vanners or "Woodbury" Concentrators for concentrating our Texas ores, I hold now to the opinion then expressed; and with nearly two years and a half further experience in their operation I can confidently assert and am more fully convinced than then, that the "Triumph" Concentrators are better in all respects than any other form for concentrating our Texas and Bully Choop ores, and in evidence of such confidence I refer with pleasure to the order recently placed with you for four (4) of the "IMPROVED TRIUMPHS," to make up the complement required for use in the new twenty (20) stamp mill at the "Cleveland Consolidated Mining Co.'s mines in Bully Caoop Mining District in Shasta and Trinity Counties, this State, and I feel assured that the improvements lately introduced into their construction will make them even better than the old form which I have had in operation for so many years past in the different mills under my supervision. I am, very truly,

(Signed) R. G. HART, Sr., Manager Texas and Cleveland Cons. Mining Co's.

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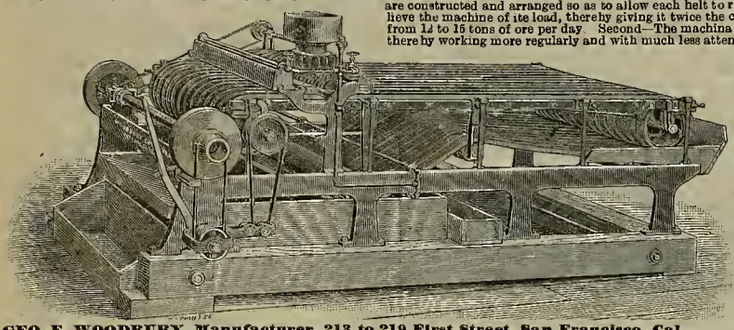
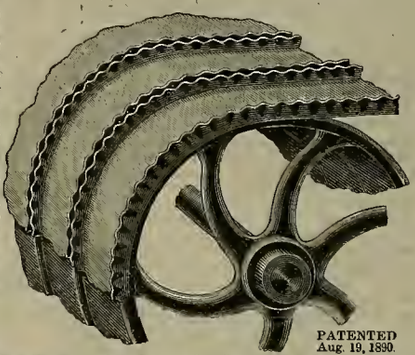
THE WOODBURY ORE CONCENTRATOR WITH IMPROVED BELTS

Was awarded the Highest (Bronze Medal) Premium at Mechanics' Institute, 1890 and 1891. MORE THAN DOUBLE THIS CAPACITY with one-half less power and occupying less than one-half the space of any other concentrator. Built of Best Steel and Wrought Iron. Strong and Durable. **Price $575 f. o. b.** Send for Catalogue and Testimonials. The annexed cut shows the belt in its improved form, which consists of corrugated edges, to form an expanding top edge. THE IMPROVED MACHINE HAS THE FOLLOWING MERITS: First—The improved belts, which consist of seven, are constructed and arranged so as to allow each belt to receive a portion of the pulp in such a manner as to relieve the machine of its load, thereby giving it twice the capacity of other concentrators, and enabling it to work from 14 to 15 tons of ore per day. Second—The machine equalizes the load by having several compartments, thereby working more regularly and with much less attention than is necessary to give other concentrators using wide belts. Each of the belts on this machine takes care of the pulp that is allotted to it—in this way preventing the pulp from running to the lower side or it, as is the case when a machine becomes out of level where wide belts are used. Third—The belts run on a perfect line, needing no adjustment to prevent their running from side to side, as in other concentrators. Fourth—The belt surfaces are improved by indentations and corrugations, causing the Concentrator to save fine sulphurets and quicksilver, and perform close work. Fifth—The belts have fluted or corrugated edges, to form an expanded top edge, which effectually prevents from cracking. Sixth—The feed arrangement is perfect. Seventh—The machine is constructed of iron, with steel crank-shaft self-oiling boxes, and everything under in the most thorough manner, enabling it to run with very little attention or wear.





PATENTED Aug. 19, 1890.

[COPY.]

Eureka Tellurium Gold Mining Company, Redding, Cal., July, 21, 1893.—Mr. Geo. E. Woodbury, 213 First St., San Francisco, Cal.—Dear Sir:—We take pleasure in stating to you that the two Ore Concentrators purchased from you last April are giving perfect satisfaction. They are simple, durable and effective, and we hereby conscientiously recommend the "Woodbury" pattern to all intending purchasers of Ore Concentrators. Yours truly,

[Signed] EUREKA TELLURIUM GOLD MINING CO., by GEO. O. JONES, Secretary.

GEO. E. WOODBURY, Manufacturer, 213 to 219 First Street, San Francisco, Cal.

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FOR THE CONVENIENCE OF OUR READERS IN THE MINING COUNTIES WE PRINT IN LEGAL SIZE, 12x36 INCHES, THE MINE BELL SIGNALS AND RULES provided for in the Voorhies Act, passed by the State Legislature and approved March 8, 1893. The law is entitled "An Act to Establish a Uniform System of Mine Bell Signals to Be Used in All Mines Operated in the State California, for the Protection of Miners." We can furnish these Signals and Rules, printed on cloth, so as to withstand dampness, for 50 cents a copy. MINING AND SCIENTIFIC PRESS, 220 Market St., San Francisco.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Mechanics and Popular Science.

VOLUME LXVII.
Number 15.

SAN FRANCISCO, SATURDAY, OCTOBER 7, 1893.

Three Dollars per Annum.
Single Copies, 10 Cents.

Electric Drills in a Quarry.

The electric percussion drill, since it was first put into practical operation, has undergone many changes, each in the line of improvement, until to-day it competes successfully either with steam or compressed air drill.

One of the most interesting percussion drill plants is that in operation at the limestone quarries of the Solvay Process Company, near Syracuse, N. Y. This plant has now been working continuously for several months and the results attained, both in amount of work done by the drills and the convenience and economy of their operation and maintenance, have given thorough satisfaction to the company first undertaking their general employment. Installed by the General Electric Company at the commencement of the past winter, the drills have operated without interruption from the intense cold, and have practically demonstrated the advantages derivable from the use of electricity in quarry work. Had steam been the only available power, conditions were such at this plant that the loss in transmission by condensation at 20° below zero would have been so great that the drills could not have been worked. The quarry, as will be seen from the cut, is situated in a desolate spot on an elevated plateau, where intense cold found full scope for action.

At the present time three "Type E" General Electric Company's drills are in continuous operation ten hours per day, drilling holes from six to ten feet in depth, and two to two and one-half inches in diameter at the top. The rate of drilling, according to the record kept by the superintendent, is from 45 to 75 feet per ten hours, averaging 50 feet per day, or 1500 feet per month of 30 days. The average distance of the drills from the power station is about 2000 feet at the present time, the circuit, three lines of bare No. 0 copper wire, being extended to a distance of 3000 to 5500 feet from the power station in one direction.

The manipulation of the drill is in every respect as simple as that of the steam or air drill, stopping and starting being accomplished by merely throwing a handle to the right or to the left, making or breaking the contact between the cable and the terminals of the coils. Not the slightest difficulty is experienced in lubricating the wearing parts or in handling the drill.

The general dimensions of the "Type E" drills, three of which are doing all the deep-hole drilling for the quarry, are: Length over all, 49 inches; outside diameter, wrought-iron tube, 7½ inches; length of stroke, 5 to 7 inches; blows per minute, 380.

The generator which supplies the power is of the bipolar type, running at normal speed, and is provided with a device for directing the current alternately into the upper and lower coils of the drills. The difference of potential at the fixed brushes of the generator is 240 to 250 volts.

The generator is belted to a 9″x12″ straight line engine, supplied with steam at 90 pounds pressure from a horizontal tubular boiler; fuel for which is brought for three miles over the cableway in the buckets used to transport the lime rock from the quarry to the works. As yet no estimate of cost of repairs can be given because up to date there have not been any. Should, however, any part break down, it can instantly be replaced, as all the parts are interchangeable. The company informs us that the plant has aroused widespread interest among quarry operators in general, and has been visited and carefully inspected by many less prone to reject the good things which advanced science offers. That electricity is

ELECTRIC PERCUSSION DRILLS IN A LIMESTONE QUARRY.

an ideal power for mine and quarry operation the working of these electric percussion drills does much to show.

The Plumas *National-Bulletin* urges prospectors to hunt gold. "Get out into the mountains and uncover a gold mine, quartz or gravel," it says. "It is far better to do this than to sit around and complain of hard times. A little more of the energy, push, ambition and nerve of the pioneers are needed to bring about an era of prosperity in Plumas."

Mineral Awards at the World's Fair.

The Bureau of Awards at the Chicago Fair this week made awards to the following for exhibits of minerals and gems:

Arizona—Collective exhibit of gold and silver ores in Arizona; collection of gold, Hubbard; silver and copper, Peabody mine; United Verde Copper Company, copper ore; Detroit Copper Company, Graham, collection of copper ore; Arizona Copper Company, Graham Company, copper ore; United Globe Copper Company, Gila county, copper ore; Jules Bauman, collection of copper ore; Old Dominion Copper Company, Gila county, copper ore; Christmas Gift, silver ore; Copper Queen Mining Company, copper ore; A. Baron & Co., Tombstone, silver, lead and zinc; T. E. Soria, Cochise county, collection of gold and silver ores; Tombstone Mining and Milling Company, Tombstone, gold, silver and lead ores.

California—S. S. Daisy, Grass Valley, collection of gold ores; California State Mining Bureau, collection of California marbles, onyx, etc.

New Mexico—Santa Fe, collective exhibit of silver ores; American Turquoise Company, New York City, turquoise; R. C. Thoeger, Hillsboro, collection of gold quartz, Sierra Company; New Mexico, Santa Fe, collective exhibit of gold ores; Mrs. J. C. Carrera, Las Cruces, collection of minerals; New Mexico, Santa Fe, collective exhibit of mineral resources of New Mexico.

Oregon—State of Oregon, collective exhibit of gold ores; Oregon Dell Mining Company, Sparta, Virtue mine, free gold; State of Oregon, collective exhibit of gold, silver, copper and lead ores.

Washington—Lookout mine and 31 others, Cascade, collective exhibit of argentiferous galena of Cascade mining district; State of Washington, collective exhibit of gold, silver and copper ores of Washington; State of Washington, collective exhibit of iron ores.

Utah—Ontario Mining Company, Park City, silver sulphurets and silver-lead ore; Cactus Mining Company, Frisco, copper ore and other minerals; Utah Territory, collection of silver ores; Wooley, Lund & Judd, St. George, collection of silver ores in sandstone; Daly Mining Company, Park City, silver sulphurets and argentiferous galena; Territory of Utah, collective exhibit of gold, silver and lead ores.

Wyoming—Uintah County State Board, Cheyenne, quartz and calcspar; State Board, Cheyenne, agate and marble mosaic; J. H. McClure, Hartsville, large moss agates; W. W. Bick, fossils and fossil fish; Welcome mine, Bear gulch, auriferous quartz; State Board, Cheyenne, collective exhibit of copper ores; State Board, Cheyenne, stream tin; State Board, Cheyenne, collection of tin ore.

Nevada—J. Grandelmeyer, Hamilton, collection of minerals; State of Nevada, mineral collection; E. G. Morrison, Eureka, mineral collection; Joseph Grandlinger, Hamilton, collective exhibit of ores; James Grandelmeyer, Hamilton, geological and mineral characteristics of metallurgical classification of ores.

Idaho—Snake River Opal mine, fire and peacock opals.

The MacArthur-Forrest (cyanide) process has been awarded a diploma of the first class, at the World's Fair, as the leading process for the treatment of refractory gold and silver ores.

MINING AND SCIENTIFIC PRESS.

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San Francisco, October 7, 1893.

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No Official Publication.

It may be information to some people to learn that there is no "official publication" or "program" of the State Miners' Association. During the two preceding conventions a publication designated as such was circulated, but it had the sanction neither of the convention nor of the Executive Committee, nor of any of the officers. It was gotten up for advertising purposes only. It literally obtained money under false pretenses. Any publication claiming to be the official programme (outside of bulletins or announcements properly authenticated by the president, secretary or Executive Committee of the association) is a plain fraud.

GEN. HENRY L. ABBOT, of the Government Board of Ordnance and Fortification, has written a letter to Dr. Stephen H. Emmens, now in this city, stating that No. 259 Emmensite has been determined to be the best explosive for use in shells, and that the board will so announce in its forthcoming annual report. Gen. Abbot further says that after exposure to the damp air the ammonium nitrate and sodium nitrate of course absorb moisture, and change the powder into a soft material which packs very much more densely than in its service condition. "We find," says the general, "that 110 pounds in this state occupy the volume required for 87 pounds with 1000 feet velocity, and 25 pounds with 1400 feet velocity. We shall probably try higher velocities although many experiments with small charges reach 2000 feet." As an explosive for use in mines Emmensite is said to be well adapted. Its expense, however, is so much greater than dynamite that no attempt has ever been made to secure its introduction on this coast.

THE Mariposa *Gazette* is much encouraged by the recent activity in mining circles in that county. There are prospectors in almost every gulch and on all the gold-bearing mountain-sides. The men all seem earnest and determined to make Mother Earth yield up some of her long-hoarded treasures. There have recently been moneyed men in Mariposa inspecting the mines, and it is almost a certainty that two of the large mines have changed hands. A large quantity of machinery has just been brought to different mines of the county, and the miners appear sanguine of success. Altogether the prospects are brighter than they have been for a long time.

THE Pan-American Bimetallic League has been in session at Chicago during the week. Addresses were made by various silver men and resolutions against the repeal of the Sherman law and in favor of free silver coinage were adopted. It is declared also that the Western and Southern States and Territories should form a close political and financial alliance.

Importance of the Miners' Convention.

[By Mr. Charles G. Yale, Secretary of San Francisco County Miners' Association.]

It is not probable that the State Miners' Convention of Monday next will be so largely attended as was the first one, held two years since. At that time, representatives from every county of the State were invited to organize; but on this occasion representatives only come from those counties where there are County Miners' Associations. The basis of representation in the convention is one delegate for each ten members of a Miners' Association. This naturally restricts the number of delegates, and confines the proceedings entirely to those directly interested in the mining industry of California.

Heretofore the main interest in these Miners' Conventions has been confined to the discussion of measures looking toward the rehabilitation of hydraulic mining; but on Monday more attention will be given to the interests of quartz miners, drift miners, and those engaged in the petroleum industry of California.

The passage of the Caminetti act by Congress has placed the Government on record as desirous of seeing hydraulic mining resumed under the specified conditions. The State, also, is on record, by its legislative acts, as favorable to the industry. The hydraulic miners themselves, while not entirely pleased with the new law, find that they can legally resume mining by complying with its conditions, whereas before its passage there was no way of doing this.

The law is, however, still on trial as to its practicability. The main feature upon which it is based, that of impounding dams for storing the debris, is entirely an engineering question, so that it is eminently proper that the operation of the law should be left entirely in the hands of a commission of Government engineers. These gentlemen are eminently qualified for their task by profession, education and experience. It is proper to note that the Anti-Debris Association has set its face against dams of any kind, contending that they will not hold back the debris properly. In this they take issue not only with the law, but the expressed opinions of engineers. Formerly attention was paid by the public to this association, but its influence has waned since so many of its utterances and acts are founded on mere prejudice. They want to prevent hydraulic mining even when the miners are doing their best to impound the debris, and wherever possible throw obstructions in the way of the miners obtaining licenses from the Debris Commission.

At the Miners' Convention some suggestions will be made looking toward certain amendments to the Caminetti act, but none of them are radical. Those which will be considered refer to certain details to facilitate the operations of the law.

The main topic of discussion will doubtless be the Stewart bill, which proposes certain radical changes in the existing mining laws of the United States. This bill has not come before Congress at this session. For three successive sessions, however, it has been introduced by Senator Stewart of Nevada, and will doubtless come up again before long. Its provisions have been pretty thoroughly discussed in the columns of the MINING AND SCIENTIFIC PRESS, and particularly by your intelligent correspondent, J. D. Emersley, of Dos Cabezos, Arizona, who has shown up its objectionable features in a very decided way. He is a prospector and miner and knows how such a law would affect the interests of those classes.

The drift miners of this State long since protested to Senator Stewart against certain features which damage their interests, but to this protest he has paid no heed. The points have all been discussed in your columns. Under Stewart's bill the drift miners are permitted to patent such very small tracts that they will be unable to run the long bedrock tunnels necessary to open such claims. It would not pay to run the tunnels unless they could obtain title to larger tracts in one piece. It is this same feature to which the petroleum men object.

Some attention will doubtless be given to the absurd rulings of the Department of the Interior and the Land Office, which, in many cases, practically set aside the law. This department-made law has greatly injured the mining interests, and the attention of Congress should be called to it.

Pending proceedings in Congress or rulings of departments have never been discussed by miners as a body, until the organization of the California Miners' Association. Individuals have protested in vain. Joint action has been necessary to engage attention. It was this which brought about the passage of the Caminetti act. If the miners will continue united, some attention will be paid to their demands. They know best how new laws will affect their interests and should have something to say before they are passed. The Miners' Convention can give expression to their ideas on these subjects, and the Executive Committee of the State Miners' Association can attend to the details. In fact, the main work falls upon this committee, and it should be carefully chosen. No one should be placed upon it for mere compliment. What is wanted is men who will give some time to the work of the committee.

Every encouragement should be given to the miners of this State by the press and the public. California has always been the largest producer of gold of any State in the Union. Its annual output could readily be doubled could the hydraulic mines all work, and did capital more freely aid the quartz and drift miner. California is so far distant from the great centers of population that it is in a peculiar position. It must attend to products which will bear distant transportation, or must restrict them. We amount to nothing as a manufacturing State, for we have no coal or iron. Our gold mines and our horticultural and agricultural products are our mainstay of prosperity. It seems strange, in view of this, that gold-mining has received so little encouragement. Our mineral products are varied, but most of them are in a backward state of development through lack of capital. People from other States recognize their value more than we do ourselves. The gold mines are sought after more to-day than they have been in twenty years past. There is more demand for this kind of mines. Our laws should encourage the miner, not discourage him; should aid, not hinder him in his efforts to obtain proper title, or to develop his claim.

These annual conventions of the miners of California are good things for the men themselves and for the industry. They show there is unity of action, and that the "miners' movement" is continuous and active. They keep up the interest in the county associations and prove the necessity and usefulness of the State Association, for to the Executive Committee of the latter organization is entrusted the carrying out of the wishes of the convention.

CHARLES G. YALE.

Important Work to Be Done.

[By Mr. W. C. Ralston, Secretary of the State Miners' Association.]

I regard the forthcoming convention of the State Miners' Association as not less important than the two which have preceded it; and I am satisfied that its influence on legislation will be even more direct and certain. Our association is now the recognized medium through which the miners of California express their desires; and it may fairly be expected that the conclusions of the convention will be the embodiment of their sentiments on the various questions affecting their interests. It may be assumed that the entire California delegation is friendly to and will advance our interests in Congress in every legitimate and practicable manner; but the particular representitives on whom we rely are Senator Perkins, Senator White, and Congressman Geary, and Congressman Newlands of Nevada, who has large interests in this State. Congressman Caminetti is no longer on the committee on mines and mining. His place has been taken by Congressman Newlands.

The association is authorized to speak for all mining interests—quartz, drift, placer and hydraulic. It is its cardinal purpose to assist all equally. It has the welfare of the quartz miner just as much at heart as the hydraulic, the drift as much as the placer. It helps most those who most need help. For that reason it has been obliged in the past to devote a large part of its time to an effort for the rehabilitation of hydraulic mining. A part of its work has been achieved. There is not a quartz or drift miner in the State who does not rejoice over the brighter prospect before his co-worker in hydraulic beds, and who does not augur therefrom that the association may do much for him. And that is exactly what it is proposed to do.

The work before Monday's convention was clearly outlined in the president's call. The Stewart mining bill, the rulings of the federal land department, and the Caminetti law are among things to be considered. The Caminetti law is not what the previous miners' conventions asked for. Several amendments are needed, and in justice should be made. The Midwinter Fair will undoubtedly be endorsed by the convention. The design now is to have several of the leading promoters of the fair address the convention and explain its scope, purpose, and probable benefit. The convention will be asked to aid a movement for a complete exhibit of the mineral resources of the State.

The convention will doubtless consume Monday and Tuesday in its deliberations. I have been notified of the appointment of delegates from a number of counties and the attendance is certain to be large.

W. C. RALSTON.

THE list of delegates to the State Miners' Convention, so far as reported to Secretary Ralston, will be found on page 257.

The Stewart Bill and the Petroleum Interest.

[By Mr. George Loomis, President and General Manager of the Pacific Coast Oil Company.]

The provision of the Stewart mining bill that no more than forty acres of petroleum ground can be included in one application for patent is, to my mind, a serious objection to its passage. Conditions must be extraordinary and unusual where a petroleum tract of only forty acres is valuable enough to justify the large expense necessary to develop it. All familiar with the industry know that no corporation will undertake to develop a petroleum claim until it has secured a large extent of territory, for the reason that enormous expense is necessary in the purchase of the adequate outfit needed to produce, refine and market petroleum in commercial quantities. Appliances for sinking wells and pipe lines, cars for transportation of the crude product to the refinery, tankage of large capacity, and an elaborate business organization, must all be provided, and at great cost. A refinery is likewise generally necessary to be constructed, if it is not desired to sell the crude product to others. The probable petroleum output of no single forty-acre tract that I know anything about will justify this outlay; and no forty-acre tract, or any other area of ground, can be worked in a satisfactory and economical manner without it.

I do not mean to say that wells cannot be sunk and petroleum secured on a 40-acre tract by small operators, at an expense of, say $8000 or $10,000; but I do mean that the cost of operation will be proportionately much greater than with large companies, and they will be obliged to sell the crude output for what they can get, which may or may not be full market price. I understand the purpose of this provision of the Stewart bill to be advancement of the interest of small operators; but I am satisfied that its practical operation will be directly the contrary. It will, of course, not affect the patented holdings of corporations at present operating; and it will prevent future concerns from entering into the industry on a large scale. The inevitable tendency will be to give a monopoly of the business to the present large concerns. Small operators cannot enter the business except on terms made by big operators.

The importance and necessity of a sufficient area of workable ground are therefore apparent.

Of course it may be said that nothing in the Stewart bill prevents any individual or corporation from acquiring unlimited territory after patent, by purchase or otherwise; or from performing assessment work through its agents on separate subdivisions before patent. The objections to the latter method ought to be obvious. It is necessary to perform annual assessment work on each subdivision, with a total separate expenditure of $500, before there is a right to a patent. It would certainly be undesirable to be required to make separate expenditures on these various subdivisions, when it might and doubtless would be necessary to confine the expenditure to one place.

But we have much more serious fault to find with the rulings of the General Land Office than with any proposed law. Under present construction of law, it is most difficult to obtain patent to petroleum ground. The Land Office holds that the known and undisputed presence of the ledge is not sufficient ground on which to grant a patent; nor is it enough to show seepage. But petroleum must actually be produced in paying quantities before title can be secured. I consider this holding an error and a grievous and unnecessary burden upon the industry. Miners for metals can secure patent as soon as it is shown that mineral is in the ground. Requirements for petroleum-mining ought not to be more severe. I hope some means may be found by which the rulings of the department may be amended.

GEO. LOOMIS.

THE plan adopted by miners along the Arkansas river, Colorado, to save the fine gold, is as follows: Sluices are used, and copper plates are placed in the last string of boxes. They are from 20 to 30 inches wide, and six to ten feet long, coated with quicksilver, and protected by a heavy wire screen resting on slats about an inch thick. A light head of water is used, the gravel shoveled into the boxes, the coarse gravel remaining on the screen; while the fine dirt, going through the screen, falls directly upon the plates. This arrangement is said to save the float gold, which it is impossible to do in ordinary sluicing.

IT is expected that the necessary appliances for the operation of machinery at the Midwinter Fair will be supplied by various machinery establishments free of charge to the exposition, in much the same manner as at Chicago. Local dealers had a meeting the other day, and the sentiment was expressed that boilers and other machinery should be placed at the disposal of the fair management. The feeling among machine men is that a creditable exhibit should be made, and there is no doubt that they will be very well represented at the fair.

A New Impounding Device.

An Invention for Disposing of Debris in Hydraulic Mining.

Just at this time, when great activity exists in the direction of efforts to resume hydraulic mining in California, it may be interesting to know that the records of the Patent Office at Washington show that in November, 1892, Ahel M. Rawson of San Francisco secured a patent for a novel and ingenious method for impounding debris in hydraulic mining. The invention has never been called to the attention of miners through the press, and the fact of its existence is hardly known. Mr. Rawson made a careful study of the scene of hydraulic operations, and his invention was worked out with great care and patience. As to its merits, they can be judged from the annexed description of its working.

It is claimed for the invention that, as the principle employed in precipitating the debris is gravity, together with a dam and settling basin, it can be used in any situation where a dam and basin can be introduced, and with far better results than with any other method heretofore devised; and as this is the only patented invention covering the ground, it behooves miners to inform themselves concerning it.

While the invention was originally designed for mining in side gulches, out of the way of torrential streams and where the amount of surface water from rain and melting snow is not great, it is claimed that it can be employed in the largest watercourses, where the torrents are heavy, with better results than any other plan contemplating a dam and settling basin. Thus, if the Government should come to the assistance of the miners by constructing large impounding works at the points where the rivers debouch into the valley, it is claimed that the Rawson invention is better for the purpose than any other that has been suggested.

Generally, under the old plan of impounding, the water from the monitors, after passing through the sluices, is turned into the *upper* end of the settling basin and allowed to flow over the dam at the lower end. This, of course, sets up currents in the basin and prevents the perfect settlement of the fine clays in suspension, and they are the dangerous element.

The Rawson invention completely reverses this process. Instead of turning in the water at the upper end of the basin Mr. Rawson carries it, by means of a lateral ditch or flume, or a flume passing over the basin, to the dam, and discharges it above the dam, from a transverse flume resting on the dam, openings being made in this flume at convenient intervals. Instead, further, of permitting the water to flow over the dam when the basin is full, he runs one or more discharge pipes, of sufficient capacity, along the bottom of the settling basin. This pipe passes underneath the dam and discharges in the gulch below. Its upper end is carried to the extreme upper end of the basin where the water is perfectly still and where precipitation of the silt proceeds rapidly. There it takes the clarified water and passes it out underneath the dam.

It will thus be seen that the radical points of novelty are these:

1. The debris-carrying water is turned into the *lower* end of the basin, instead of the upper end, leaving the upper end perfectly still and free from currents, so that precipitation of even the finest silt will be rapid.

2. No water is permitted to flow over the dam, thus eliminating a great source of danger to the dam itself.

3. The water is discharged by means of pipes running along the bottom of the basin and underneath the dam, the receiving end being at the undisturbed *upper* end of the basin, where precipitation is rapid.

With the precipitation of the debris the bottom of the basin rises and its capacity diminishes. The invention provides in two ways for this condition, as follows:

First, the dam can be built higher, the settlement and annealing of the coarse gravel against its upper face constantly adding to its strength and thus making the cost of raising it less than in those methods in which the water is turned in at the upper end of the basin.

Second, the invention contemplates, by employing simple devices at the openings along the transverse flume, the precipitation of the coarser gravel against the upper face of the dam. In this way it is assumed that this bed of gravel, thrown across the whole width of the basin and against the upper face of the dam, can be made to grow by accumulation, eventually forming a crest higher than that of the dam, and that when this crest rises to the height of the transverse flume the latter can be advanced up the basin a short distance and a new gravel crest formed as the other. This process can be kept up indefinitely, the idea being that the dam is to act as a lodgment for the accumulation of a gravel dam, which will become solidified by the action of its cements. If this idea should prove successful in practical application, it is evident that the dam will not have to be built up as the basin fills with debris, but that the real impounding dam will be that which the gravel makes—a self-constructing dam, in fact.

As the basin advances up the gulch more joints are added to the upper end of the discharge pipe, so as always to keep the receiving end at the extreme upper end of the basin.

For disposing of whatever surface water may occur in the side gulches it is evident that there is at hand a carrying capacity double that provided for disposing of the hydraulic water. If a storm should occur the mining operations can be temporarily suspended and the surface water led out of the gulch into the ditch or flume provided for carrying the hydraulic water down to the transverse flume at the dam and discharged below the dam through a gate. If this should not prove sufficient to carry off the surface water the surplus may be taken out through the discharge pipe passing from the upper end of the settling basin underneath the dam, extra lengths of pipe being temporarily added for that purpose.

Further means of disposing of surface or torrential water are matters of engineering detail and will occur in any plan employing dams and settling basins. The Rawson invention rigidly prohibits the taking of this water into the settling basin and the flowing of any water over the dam.

ELEVEN MINERS arrived in this city from Alaska last week, and report having had a very hard time in the Yukon district. They labored mostly on Forty-mile creek, a tributary of the Yuhon, 40 miles below old Fort Reliance and 1700 miles up from St. Michaels. They say that mining in Alaska is like a lottery—some strike it, others do not—an experience that holds good in other countries than Alaska. The hardships that beset mining in parts of Alaska are undeniably great. An instance is recalled by the writer: Over four years ago he met a miner who had come down the Stickeen river on the ice from across the divide, where he had been all winter, with absolutely no communication with the outside world. He first heard of the result of the presidential election of 1888 in April, 1889. On the journey down a heavy thaw set in, and the ice broke up. His Indian attendants deserted him with their dogs. After incredible hardship, he landed on an island at the mouth of the river. Secreting $10,000 of gold dust in a tree, he constructed a raft, and by 24 hours hard work managed to reach Fort Wrangel, a few miles distant. He returned in a boat for the gold dust. But this is an exceptional instance. Near the coast the Alaskan climate is much milder than is generally supposed.

AT a meeting of the San Francisco City and County Miners' Association on Wednesday, Henry Pichoir was chosen president and Charles G. Yale secretary for the ensuing year. The following additional officers were chosen: Vice-presidents—G. W. Grayson, A. J. Ralston, Samuel J. Hendy, J. O. Whitney and B. F. Dunham. Executive Committee—C. W. Cross, S. K. Thornton, W. W. Montague, I. C. Stump, W. H. Crocker, Louis Sloss Jr., Thomas R. Church, William Irelan Jr., John Birmingham, W. Steinhart, W. H. Merry, D. M. Burns, Thomas Price, W. T. Y. Schenck, George H. Sanderson, James G. Fair, J. L. Flood, Louis Glass and J. K. Firth. It was decided that the county association indorse the Midwinter Fair, and any action the State Association may be pleased to take toward furthering the idea. A committee consisting of Samuel J. Hendy, Charles G. Yale and A. J. Ralston was then appointed to call upon the directors of the fair so as to be able to make a report to the convention as to the wishes of the fair commission. Delegates were also chosen to the State convention. The list may be found on page 257.

UNITED STATES patent has been issued recently to Chas. J. Farwell of London, England, for treating refractory ores. This process is for treating ores carrying precious and other metals, to oxidize and eliminate the associated sulphur, arsenic, antimony and tellurium compounds by subjecting the crushed ore in a fine, free-falling stream to increasing degrees of radient heat and a reversely flowing current of hot air and steam, out of reach of contamination with the furnace gases, the particles of incandescent ore being then quenched in cold water to split up the particles, remove scales and generate steam to assist the oxidizing and desulphurizing action of the air. The new process is preferably carried out by means of a furnace formerly patented by the inventor. The Deadwood *Times* says: A laboratory test of the method was made at Cheyenne, Wyo., by Fr. Farwell on ore from the recently-discovered mines near Lander, which proved highly satisfactory, so much so that local capitalists have formed a corporation for the purpose of erecting works to be operated under the process and patent.

Slickens.

JOHN DAGGETT of California, superintendent of the Mint at San Francisco, has been confirmed by the Senate at Washington.

THEEE is said to be no let up to the gold excitement in Alherni, British Colnmbia, the latest find heing a vein of free gold from fonr to six feet wide, in which gold is visible to the naked eye.

THE Veta Madre Mining Co., recently incorporated here, propose to work and develop what has heretofore been known as the Bright mine near Jackson, Amador county. It is expected that the new company will commence active operations dnring the early part of next month.

THE Martha Washingtou Mining Co. of Oakland has heen incorporated. Capital stock, $500,000, with S. Gertrnde Smyth, M. H. Kenny. C. L. Flint, P. T. Burrell and Mary T. Littlefield of Oakland, E. J. C. Gilbert of Berkeley and Amelia Griffith of San Francisco as directore.

THE Golden West Consolidated Gold Mining and Milling Co. of Sheep Ranch, Calaveras county, has been incorporated. Capital stock, $200,000, with W. G. Mills, C. B. Mills and Harvey Childs of Sheep Ranch and Thos. C. Archer and Ethan M. Wilson of Los Angeles as directors.

THE Daisy Hill Mining Company has heen incorporated in San Francisco with $500,000 capital stock, half subscribed. C. A. Roberts holds most of the stock, and his associate directors, each with five of the $5 shares, are Alfred H. Walker, C. H. Kingsley, Charles H. Taylor and A. Evelyn Ball.

W. T. PHIPPS, manager of the State Anti-Debris Association, has returned from Washington, where he weut to confer with the Senators and Congressmen regarding pending and prospective legislation affecting the valley interests. His report will be made to the association, and he is not now very communicative.

ME. W. B. SOESBY, a New York capitalist, prominently interested with the Playa de Oro Mining Company, of Ecuador, has been in Sau Francisco for some days making arrangements for the shipment of the final consignment of machinery to Ecnador for operation of the mines. He returns shortly to New York, whence, with President C. C. Francklyn and others of the company, he will proceed to Ecuador.

IT is said to he the intention of the South Yuba Company to push their ditch through to Clipper Gap hy next summer. Mr. W. M. Baker, for the company, has been visiting the farmers along the proposed route from the present terminus of the ditch at Long ravine to Clipper Gap, in order to secure their signatnres to an agreement granting the company a right of way. He visited the farmere and land-owners in tbe Colfax district last week; every oue eigned.

THE Consolidated California & Virginia Mining Company dropped 20 men from the force employed in the underground operations last week. The reduction was made in compliance with an order from the Trustees. The gradual exhaustion of the ore resources above the Sutro tunnel level is snrmised as the cause of the order. There is a large cash balance in the company's treasury, and the bullion output this month will leave a fair margin above operating expeuses.

A DISPATCH from Chicago says: George F. Kunze, of the Mines and Mining Building, assisted by Dr. Huntington of Harvard, polished two diamonds with the dust of meteoric iron found at Cenon Diable, Ariz. This is the first time diamonds were ever cut, ground or polished except with diamoud dust. Prof. Kunze, in a paper read before the Chicago Academy of Sciences, characterized meteoric dnst as a diamond or a substance fully as hard. The experimeut attracted great attention, as it was entirely novel.

SUPERINTENNENT DAGGETT of the Mint has notified William Andrews, for 12 years humid-assayer of the Mint, that the position will he aholished. Mr. Andrews, therefore, goes out. The following appointments are announced: Adjosters—Mrs. D. Green, Miss Mamie Hogan of Placer connty, Miss Cornelia H. Ballard of Sonoma county, Miss Cornelia L. Nokes, Miss Annie McGreeny, Mrs. Lena McNevin; assistaut engineer, P. A. Kearney of Alameda; fireman, B. Halse; conductor, Addison Bassett; Henry Ream, workman in coiner's department; David Adderson, sweep-cellar operative; O. C. Hewitt and A. D. Pratt, helpers in refinery department.

COLORANO PAPERS report an interesting discovery on the Nil Desperandnm claim, Cripple Creek, in a shaft heing snuk on the Something Good lead, which has heen traced into this ground. It consists of gray copper in a streak lying close up against a streak of crystallized quartz, which latter shows considerable free gold. Some gray copper has been found in the Bogart claim, which lies abont half a mile northeast of the Nil Desperandum, which yields about 100 ounces silver to the ton. Native copper has been found in small qoantities ou several properties in this gulch, bnt thus far tbis is the first instance where the two minerals, gray copper and free gold, have been found in the same vein.

THE liveliest town in Colorado is Cripple Creek, says the Denver *Mining Industry*. Its gold production is constantly increasing, and the growth of favorable opinion regarding its fnture keeps even pace with the increase. Population is growiug, and it is safe to say that at preseut rates it will numher from 15,000 to 20,000 by next spring. The ontput of smelting and stamp-mill ore of Cripple Creek for the month of August is reported as follows: Smelting ore, 913 tons, valued at $115,960; numher of tons treated at the stamp-mills, 4352, which yielded $47,031 in gold; placer gold aud ore treated at cyanide mill, $12,809, which hrings the total value of the outpnt for the month to $175,000. The Septemher returns will exceed the August hy at least $25,000.

THE burlap process of saving gold, which is working satisfactorily in Idaho, is this: In the hottom of ordinary rocker a hurlap sack is placed. The gravel and sand are thrown upon what is called a grizzly or big iron sieve. The larger pieces of rock are hrnshed aside, the finer particles falling into the rocker. The flour gold settles in the meshes of the sack. Every day the hurlap is washed in a tub of clean water and the fiue particles of gold are thus secured. The Homestake Company for several years past have used Brussels carpet for the same purpose, over which the tailings from the mills are allowed to rnn. When the carpet becomes so saturated that it will not take up more, it is removed and hurned, and the result always proves profitable.

THE Chicago correspondent of the London *Mining Journal* is not pleased with California's miueral exhibit at the World's Fair. He says in the issue of Sept. 16: "The Californian exhibit is disappointingly small for so prodnctive a State. The writer, when visiting California iu April, noted the general apathy of its leading mining people iu regard to representation at the World's Fair. Hydraulic mining has for a considerahle time heen almost entirely prohibited in that State, and mining generally appeared to be iu a somewhat depressed condition. The exhibit in the Mines building has, however, heen saved from insignificance by the energy of the Commissioner and of the State Mineralogist. The most popular of the exhibit is a collection of historical relics, inclnding some of the first gravel-washing appliances used. Some interesting specimens of cinnabar from the New Almaden quicksilver mines are included in the collection of ores. There is a good display of marble of various kinds, of which the pavilion is partially constructed. In the east gallery of the Mining building the New Pedrara Onyx Company, of Lower California, a Mexican territory, has a fine exhibit of slahs and other specimens from their onyx quarry."

Foundry Notes.

MRS. EUGENIA SHELBY, of Portland, Or., has been designated by the Common Council of that city to touch the button that starts the hattle-ship Oregon down the waye on the occasion of her launching.

WM. H. MILLEE, with F. A. Huntington, has received the following telegram:

"CHICAGO, Oct. 4, 1893.

"Announcement of award to Woodbury concentrator. Feeling well. GEO. E. WOONBURY."

DISPATCHES from Chicago state that the bureau of awards has made an award for exhibit of street cars and aerial appliances to A. S. Hallidie for passenger and grip car, ropeway and grip, historical collection of cable systems of pulleys; California Wire Works, wire ropes and cables.

Bunker Hill and Mayflower.

Dr. Stephen H. Emmens, of Youngstown, Pa., haa arrived in San Francisco, and, with his son, will take up hia headquarters here pending the development of the Mayflower mine in Amador county, and the resumption of work on the Bunker Hill. Dr. Emmens ia lessee of the mines and the former Bunker Hill mill and chlorination plant. The Mayflower is a virgin property, adjoining the Bunker Hill, and it appeara to be a very good one. A shaft has been sunk over 300 feet, and by crosscut a big chimney of rich ore has been struck. Ten stamps of the mill have been started, and ten more will soon be at work. The mill is a part of the Bunker Hill plant, but it will hereafter be known aa part of the Mayflower. There are 40 atamps.

The Bunker Hill haa long been known as a good property. With the Mayflower it was part of the assets of the Spring Garden Bank, of Philadelphia, and operations were suspended following the troublea of that inatitution. The main ahaft is down now about 800 feet, but there are 500 feet of water in the mine. It ia proposed to drain the mine—a feat that will take about five months—and continue the work of development in connection with the Mayflower. The properties will be developed by separate companies, but Dr. Emmens will act as general manager of both. Twenty atamps of the Mayflower mill will be devoted to crushing Bunker Hill ore until the company is in ahape to construct a mill of its own, or some other arrangement, such aa the enlargement of the Mayflower mill and works, is made. There is much low-grade ore now above water level, and it will probably be worked while pumping is going on. It ia deaigned to extend the shaft about 400 feet more, where it ia believed a lower zone of high-grade ore will be atruck. The Bunker Hill has yielded richly in the past, having turned out over $1,000,000. The Mayflower is doubtless just as good a property.

Dr. Emmens will leave shortly for the mines. While in Amador county, it is hia intention to make a critical peraonal examination of the mother lode and ita geological formation. The result of hia inveatigations will probably be embodied in a monograph, which will no doubt be a valuable contribution to literature on the aubject. Dr. Emmens, who has apecial knowledge on many mineralogical aubjects, ia well known as an authority in metallurgical and mineralogical circles, and his views are quite generally aought and heeded. Among recent articles from his pen are papers on "The Treatment of Zinc-Lead Sulphidea" and "The Metallurgy of Nickel," in the well-known work, "The Mineral Industry" for 1892. He has established headquarters at room 165, Crocker building, San Franciaco.

THE Tuolumne *Independent* of Sept. 30th gives a complete review of the mines of Tuolumne county, and announces that hereafter it will devote more space and attention to the mining industry. The example of the *Independent* is commendable.

THE place and time of meeting of the State Miners' Convention are at San Francisco, Pioneer hall, Fourth street, near Market, October 9, 1893.

The Great Playa de Oro Placer Fields.

It is altogether probable that the coming year will witness the consummation of a placer mining project in South America by American capitalists that fairly rivals the largest schemes ever projected by California hydraulic miners, and that in its ultimate fruition is expected to exceed in dimensions and results the largest single similar enterprise undertaken anywhere in the world. The Playa de Oro placer fields in Ecuador are believed to be the richest and most extensive new properties yet discovered, and the work of development has been undertaken by an investment and in a manner that indicates both the good faith of the owners and their thorough conviction of the value of the placers.

The history of the enterprise and the plans of the Playa de Oro Mining Company are sufficiently interesting to justify a brief review. One year ago the late Dr. Henry De Groot, after thorough investigation, contributed an extended article on the subject to the MINING AND SCIENTIFIC PRESS. With that exception and with the exception of one or two other recent local publications which were erroneous and misleading, the company has not appeared much in public print. It has, in fact, been a part of its policy to perfect its plans quietly and to avoid publicity as much as possible. About two years ago Otis S. Gage, of New York, while on a business visit to the city of Guayaquil, in the Republic of Ecuador, met there a banker named Jose Maria Borja, who gave him information about three Spanish grants located in the Province of Esmeraldas, and which were represented to contain extensive placer deposits. The title to one of these properties rested in the banker. These placers are worked by the negroes who inhabit the country, but in such an inefficient way that they afford the owners no revenue. As a consequence, he was anxious to have them pass into the hands of parties who could make their wealth available to all concerned. Senor Borja had arranged for the mines on his grant to be examined and reported upon by Clarence E. Dougherty, a mining expert who had resided in Ecuador for 20 years. Encouraged by the statements made in this report, Mr. Gage took an option on the three properties, which, on his return to New York, he passed over to syndicates of capitalists, who sent F. S. Ketchum, an experienced mining expert and engineer, to further examine and report upon them.

A little later, Russel F. Lord, C. E., E. M., was dispatched on a similar errand in connection with the Playa de Oro property, he being further charged with the duty of selecting a suitable point at which to commence operations, make estimates for plant, etc., if in his opinion the proposed investment promised to be a good one.

Two of these Spanish grants—the Playa de Oro and Cachavi—are now owned by American corporations, each company assuming for its title the name of the grant.

The Playa de Oro property is about 11 miles distant from the town of Concepcion, as the river flows, and is on the Santiago river, a large and rapid stream flowing through the estate in a westerly direction to the Pacific. It is from 500 to 800 feet above sea level. The property forms a parallelogram, comprises 20,000 acres, and is joined by the Uimba estate on the north, and the Cayapas river on the south. Gold-bearing beds cover the whole extent of the property, but only the gravel banks of a thickness of from 30 to 80 feet it is proposed to work. From the separate reports of the several engineers who have made personal survey and examination of the gravel beds, the following statements are taken: The gravel banks are exposed everywhere along the hanks of the river; in the numerous cuts made by the natives in their efforts at mining, which is their only means of subsistence; along the gulches (quebradas); and everywhere that the soil, which averages about four feet in thickness, has been removed. The auriferous gravel beds average about 50 feet in thickness and only in one place was the bed found but 15 feet thick, while in many places it is 80 feet. The gravel is auriferous throughout, the presence of a small percentage of clay having prevented the bulk of the gold siuking to the bedrock, a soft formation, apparently of marine origin. The elevation of this bedrock ahove the outletting streams varies from 20 to 100 feet, insuring everywhere ample dump for tailings. As the gravel here contains no pipe-clay, hard cement or large boulders, it can be broken down and washed with a moderate head of water. No bedrock tunnels, derricks or powder blasting will here be required.

A cut in the Medio Mundo bank, near the town of Playa de Oro, has heen worked back some 300 yards from the river through gravel 45 feet thick, exposing the bedrock for that distance. It shows a good grade for sluices and dumps, its elevation being 50 feet above hedrock and washed by natives in their crude way yielded 97½ cents gold. Other washings of single cubic yards yielded various amounts. But the most satisfactory test has been made within the past six weeks, under direction of Engi-

neer Lord. Eighteen cubic yards were measured, worked and washed through sluices in exactly the same manner as it is proposed to develop the placers. The yield was 38 cents per cubic yard.

Rains in Ecuador are constant, and the water supply is enormous. At the town of Playa de Oro, the Santiago river (500 feet wide) averages 300,000 miners' inches of water of 2160 cubic feet each in 24 hours, or 7500 cubic feet per second. The water for the mines will be taken from a branch of the Santiago (Rio Francklyn) at a sufficient elevation to give a large head. The elevation of the river at the point where the initial canal will be built is 330 feet above bedrock at the placers. Engineer Lord says that the canal from the Rio Francklyn should have a capacity of 6000 miners' inches of 2160 cubic feet per 24 hours, or 97,000,000 gallons. It is estimated that with a four per cent grade for sluices, one miners' inch of water will wash four yards of gravel in 24 hours. Six thousand miners' inches, at four cubic yards each, will wash 24,000 cubic yards in 24 hours. At the average value of 38 cents per cubic yard the maximum result of 24 hours' hydraulicking would be over $10,000. The result could be increased to any extent by the employment of more giants, the supply being practically unlimited.

The extent of the gravel beds is prodigious. The property covers about 60 square miles, and it is roughly estimated that there are about 1,600,000,000 cubic yards of gravel between bedrock and the grass roots. If there is an average gold value of 38 cents per cubic yard, the value of the deposit is $600,000,000! It is thought that several million dollars per year can be secured if the banks are worked at the capacity of the hydraulic appliances proposed to be put in. These figures stagger belief, but they seem to be justified. It is estimated that gold can be secured at an average of three cents per cubic yard. There will be no trouble about the disposal of the debris. There are on the ground, or purchased and about to be shipped, six miles of iron piping and four giants. One of these latter is 9 inch, which indicates pretty clearly that the company propose to wash out a great deal of gravel.

The company has conducted its operations from New York, largely through San Francisco. Last February the schooner Nora Harkins left this port for Ecuador, having on board twenty miners, mechanics, machinists, etc., recruited in this State by Mr. Eaton, the agent of the company in this city, and $75,000 worth of machinery, hardware, iron pipe, stores, etc., etc., purchased here. Later the steamer Alice Blanchard was chartered to carry a second installment of machinery and supplies ($50,000 worth), but the vessel, while on her way from Puget sound, went ashore at the entrance of Yaquina bay, and was detained nearly three months. The long delay of the steamer and some other matters not necessary to recite in detail, caused a change in the company's plans, and litigation arose. In connection with this matter and with the employment of California miners, pipemen and others, publications have recently been made which not only place the company in a false light, but which were not justified and were untrue. One of the machinists, John George, who went to Equador in February in the employ of the Playa de Oro Mining Company, returned in August, and, in an interview in a Grass Valley paper, reprinted in this paper, August 26, with proper credit, gave what purported to be his experience in Ecuador and seriously reflected upon the company — which, however, was not mentioned by name. The MINING AND SCIENTIFIC PRESS has investigated his charges, so far as they concern the relations of the company with San Francisco and San Francisco business men, and finds them wholly unfounded. The company has purchased about $125,000 worth of machinery, pipe, stores, etc., etc., here, and has paid cash in every instance. Without exception, business houses with which the company has had dealings refer to it in the highest terms. George made other statements about the company's payments to the men which we are also fully satisfied were not justified. Contracts were made with the Californians before they went to Equador for one year, as to the character of work, cost of provisions, manner of payment, etc., etc. They appear to have been carried out to the letter. The men were paid from the time they left San Francisco, and in other ways their welfare was looked after by the company in a most generous and considerate manner.

It is designed to ship the stores and appliances still remaining in this city at a very early date. The misfortune of the Alice Blanchard, and the recent financial crisis, have been chief causes of the delay; but the company is now in shape to go ahead with its project. The work of preparation for development has meanwhile been going steadily forward in Equador. The total cost of the company's outfit will be $275,000, including all preliminary expenses.

The attitude of the Ecuadorean government toward the enterprise was shown by the recent action of the local Congress in making a law exempting the Playa de Oro and certain other mining properties from all manner of taxation—State, municipal, export, or import—for 25 years. In addition, all mining machinery and material are admitted into the country free of duty. These most liberal laws were enacted with the view especially to encourage the development of the Playa de Oro and two other properties, of similar titles, in the province of Esmeraldas.

Limitations of the Gold Stamp Mill.

[Paper read by T. A. Rickard, of Denver, Colo., before the American Institute of Mining Engineers, August, 1893.]

IN TWO PARTS—PART II.

We have glanced at the results produced by the turn of the stamp upon the ore. Upon the mechanism itself the results are beneficial. The revolution of the stamp equalizes the wear upon the shoes and dies. It tends, also, by maintaining an even crushing surface, to prevent that decrease of efficiency which occurs when either hammer or anvil has an irregular face.

Water is the vehicle used for the removal of the valueless portions of the ore from those which are valuable. Its low specific gravity, as compared to both the metal and its enclosing gangue, enables us to use it as a medium for their separation. A liquid having a specific gravity greater than that of water, and intermediate between that of the gold and its gangue, would be more effective if its use were practicable, which it is not.

In the mill, however, specific gravity is not the only factor we have to consider. The water discharged from a stamp-mill often transports the heavy pyrites farther than the light quartz. This is due to the fact, already referred to, that the pyrite remains inside the mortar longer than the quartz and becomes pulverized to a further degree of fineness. It therefore presents a larger surface to the water. Again, the metallic sulphides commonly occurring in gold ores have a cleavage more highly developed than that of quartz; therefore, while the latter finds its way into the water in irregular and angular grains, the former will be found in thin plates and flakes, which readily float upon a running stream.

Water is the fluid used, but air also plays its part. During the time of its violent agitation under the falling stamp the water entangles a certain amount of air. Such air exists in the form of small bubbles, which hold the finely-pulverized ore in suspension and thus become the main agent in the floating of the slimes. Warmth causes the air to expand and the bubbles to become dissipated; therefore any rise in the temperature of the water, such, even, as is caused by the impact between the stamps and the ore upon the die, is favorable to a diminution in the amount of slime.

When the pulp is discharged from the mortar-box it runs down copper plates covering long, sloping tables. The copper, whether plain or silver-plated, is provided with an amalgamated surface, and it is this amalgamated surface which is supposed to do the work of arresting the gold. Mercury unites with gold, forming a heavy amalgam; but, in practice, it is found that a plate which is covered with a good coating of gold amalgam will serve to arrest gold much more effectually than a clean surface of either amalgamated silver or copper.

The amalgamating tables have a slope varying with the amount of water used, the heaviness of the pulp and the rapidity of the crushing. A gradient of seven-eighths inch per foot is common in Australia, while in Colorado the inclination is over two inches per foot. The colonial mills consume five gallons of water per stamp per minute, while those of Colorado use less than two gallons. Theoretically, the use of the least possible quantity of water, and the spreading of the pulp over the largest possible surface, will give the best separation of the gold from the gangue. In practice, the varying composition of the ore prevents a nice adjustment of the conditions. You may readily determine an inclination which will be most effective in causing a separation of the gold from the quartz, but it may be such as to cause the pyrite to settle. On the other hand, the slope may be so adjusted that the pyrite is carried away; but such conditions may then be obtained as will also permit of the escape of the gold.

The amalgamating tables are attached to the framework of the mill. The vibration set up by the falling stamps causes a pulsation of the water flowing over the plates similar, in a way, to the action of a jig. This assists the work of gravitation. The vibration has, however, another effect, namely, that of crystallizing the iron of the working parts of the mill, making them brittle and decreasing their time of surface. In this, as in other respects, the stamp-mill presents contradictory features.

At the outset, we described milling as the art of treating an ore so as to extract the maximum of value at the minimum of expense. Let us apply the description to the two types of mill to which particular reference has been made. In Colorado a stamp crushes one ton of the ore of the Gilpin county mines in 24 hours, and the cost, using free water-power, is 70 cents. In California the best equipped large mills crush at the rate of rather more than 2½ tons at a cost, also using free water-power, of about 35 cents per ton. The extraction in both regions will be, by amalgamation alone, about 70 per cent. We will omit the amount extracted by the concentration of any valuable pyrite, because the percentage of such material is very variable, and it forms a by-product, the value of which depends largely upon local conditions.

The ore of the Gilpin county mines carries about 15 per cent of pyrite and other heavy sulphides. The gangue is more feldspathic than quartzose, and is the product of the alteration of the country rock—granitoid gneiss—and of the dikes which penetrate it. The gold is not only present in a state of very fine subdivision, but it is also intimately associated with the pyrite.

On the other hand, the mill-stuff treated in Amador, Calaveras and Tuolumne carries from one to two per cent of pyrite. The gangue is quartz, but the ore also contains a very large proportion of the country rock, which in this case is slate, augite schist and diabase. Of these, slate predominates. The gold is coarser than that of the Colorado ore, and it is not so closely associated with the pyrite.

Let us now consider the results to be obtained by an interchange of treatment, using California batteries on Colorado ore and *vice versa*. The Gilpin county ore is of medium grade, say 8 dwts., or $8 per ton. The local methods extract $5 60 at a cost of 70 cents. A California mill would give an extraction of only $4, but would crush such soft ore fully three times as fast, so that the cost would be say 25 cents, giving a net yield of $3 75 as against $4.90 obtained by the methods of the district. Here, the slower mill gives the best results with a particular ore, and the Colorado millman considers the Californian very stupid because he does not use Colorado methods. Let us go to California and use the Gilpin county mill upon an ore of simpler character and of lower tenor. We will consider the treatment of an ore containing 6 dwts., or worth $6 per ton. The California mill would extract 70 per cent at a cost of 35 cents, leaving a balance of $3.95 per ton. The Colorado battery would extract an increased percentage, say 75 per cent; but the ore being much harder than that of Gilpin county, the crushing capacity would be less and the cost per ton greater than when treating Gilpin county ore, say, therefore, $1 per ton, leaving a net yield of $3.50 per ton. The California mill, if crushing 100 tons of ore per day, would therefore show a profit of $45 per day greater than that of the Colorado mill. As a matter of fact, there are other practical considerations which would render inadvisable the interchange of methods, among which may be mentioned the smaller size of the ore-bodies of Gilpin as compared to those of California; while it must also be remembered that the construction of a Colorado mill of a capacity equal to that of a California plant would require twice as much capital.

The comparison just made will serve as an illustration of the fact that milling is a business for getting money, and not a scientific pursuit directed to the obtaining of a perfect metallurgical treatment.

The contrast between the methods in use in two mining districts in the same country, illustrates the first axiom of all successful ore-reduction, namely, that the treatment must be suited to the character of the ore. Colorado methods in California would probably fail just as surely as California ways have been unsuccessful in Gilpin county. This is a truism not always remembered by machinery firms, who do not desire to be bothered by the making of new patterns. Too often, the ore is required to bend to a certain treatment in a mill of a particular design, instead of the mill being modified to suit the necessities of a particular ore.

The stamp-mill has presented to us many contradictory features. It is seen to be compounded of good and ill. It may be simple, but it is clumsy; it may be crude, but it is effective. As a machine, it has undergone an evolution common to all human inventions. It was founded on the first stone implement of the prehistoric savage; it became modified into the *matate* of the Mexican and the tilt-hammer of the Chinese; it progressed until running water was called in to aid human muscle, and, in the machine of the Hungarian peasant, it reached the primitive type from which our present mills were evolved. How great has been the comparatively recent improvement can be seen by stepping from Hungary to California.

In the valleys around Verospotak, in Transylvania, the larger mills consist of twelve stamps, in coffers holding four each. The power is derived from an overshot water-wheel 10 feet in diameter. The cam-shaft is of iron, and revolves on agate bearings, lubricated with water. The lifter, or cam, is iron-shod. The stamp weighs 250 pounds,

and has an agate head. The stem, the coffer, and all the rest, are made of beechwood. Each stamp drops 30 times per minute, and crushes about 300 pounds of soft ore per 24 hours. These machines have changed but little since the time of the Roman occupation under Trajan, when this district was a part of the province of Dacia.

Let us now go to California, whose record is little more than the record of a generation. Among the foothills of the Sierra Nevada we find mills containing 80 stamps, weighing 750 to 850 pounds each, and dropping 95 times per minute. Those of the working parts which are not of iron are made of steel. At single mills, 200 tons of ore are crushed per day. The mill building has a height of 70 feet, and the ore is never touched by manual labor from the moment that it arrives at the top in the mine-cars to the time when it is discharged at the bottom as waste.

In Transylvania, the individual shareholder often has his own mill; in California a thousand unite to operate one, which can, in 24 hours, treat as much ore as the Hungarian mill crushes in 100 days. The little machine of the Hungarian has been tapping away like a woodpecker for 18 centuries, and yet has not produced as much gold as has been contributed in the brief time of one generation by that completer mechanism whose muffled thunder echoes among the canyons of California.

What has been done may serve as a measure of what can yet be done. Perfection is as unattainable in milling as in any other branch of industrial art; otherwise progress were soon ended. We can compare the old mill with the new, not only with a complacent satisfaction at the advance that has been made, but with the consciousness that where so much improvement was possible, much room for improvement must remain.

It is not for me to attempt to foretell what place the stamp mill is destined to hold in the metallurgy of the future. Let me, however, in concluding, suggest the reflection that though the appliances of to-day may show a great advance upon the older more imperfect type from which they were evolved, yet there is no mining district that possesses a mill which cannot, in some essential, be improved upon.

How to Build Good Roads.

IN TWO PARTS—PART I.

[The following paper on how to build good roads, and what are the best and most economic roads, was written for the late California Road Convention by W. E. McClintock, C. E., of the Massachusetts Highway Commission.]

It would be of little use to one who has gained his experience in the study and manipulation of the roads of Massachusetts to attempt even an outline of the necessary policy to be pursued in the management of California roads. There are, however, some few general principles that must be borne in mind and which will apply equally well to any location.

It must be remembered at the outset that the weather is a very important factor among the numerous agencies which are constantly at work tending to destroy a road. By far the greatest wear of an ordinary country road is from the falling rains, the strong, dry winds, or the expanding and contracting influence of frost.

The effect of the rain is twofold: First, it washes the surface; second, it passes to the foundation.

The surface wash is of three kinds, viz.: First, by the water accumulating in the side gutters. These are made so deep and wide as to encroach on the roadway, when they become dangerous. Second, by flowing from the center of the roadway to the gutters, channels are formed which gradually become a source of annoyance and soon render the way unsafe. Third, by following small wheel-ruts on a falling grade the center of the roadway is slowly but surely made the gutter, and is thus destroyed.

The rain water reaches the foundation of a roadway either by passing directly through the surface, if it be loose and porous, or by soaking in from the sides. In making a study of the effects of water on a roadway, it is well to bear the above facts in mind, and then determine what action is necessary to prevent waste and destruction.

In this connection we find that the two essential features of a perfect road are a porous foundation and non-porous surface.

With a porous foundation all water will quickly pass downward; none will stand to soften the ground and the frost can do but little harm to the roadway if it be free of water. Underground water which flows toward the road will be powerless to harm it, if its foundation is porous, so as to permit the same to pass downward, or if it is intercepted by a drain or drains and thus carried to some convenient water course. If the road traverses a sandy or gravelly location, no precaution need be taken to secure a drainage of the foundation, as nature has already furnished it. On such a soil we shall need no heavy stone, no extra depth of any kind of stone, and no drains. If the natural soil over which the road is laid out be clayey or loamy and impervious to water, then we must take those precautions which will furnish an artificial porous foundation. If the road be on a hill-side, a drain constructed on the uphill side will prevent any water from passing underneath it.

If the road traverses level ground, one drain on each side must be built; or instead of these, one in the center, with a slope of the impervious material toward the center from both sides, the proper crown being made by the top covering. The drains may be built of rough stone, laid in the bottom of a trench from two and a half to three feet deep, or of common tile or vitrified pipe with open joints. Small stone or fairly good-sized gravel stone should be filled in over the drain to the top of the trench. The drain must lead to a water-course or to the surface of the ground at a point where it can readily flow away; otherwise the water will pass to the lowest point of the road and there stand until it so softens the foundation as to render it unable to bear up the traffic. Open side ditches will accomplish the same results as the drains, and if the road be through a farming country, or, in fact, any section where the open ditch will not be an objection, it can be built for far less money, and may, on the ground of economy, be adopted. If the natural soil be heavy clay it may be necessary to put in a center drain, or to place coarse stone carefully under the whole width of it, so as to permit the water to easily pass to the side ditches or center ditch, whichever may be used. Our motto at this point should be, keep all water from the road foundation.

We will now pass to the effects of rain falling on the surface. If the wash of the gutters be great, the only remedy will be to pave them with any kind of rough stone which may be most conveniently obtained. Such a pavement is comparatively inexpensive, and will save enough to more than pay for it. At times the water may be removed in the grass gutters, with no expense for pavement. If possible, the growth of grass should be encouraged at the sides of the road and the gutter made rather broad and flat, as by such an arrangement the water will be spread out more and its velocity be greatly reduced, thus preventing washouts.

We have already discussed the question of how to keep the water out of a foundation when it flows toward it from the sides. We will now treat of that part of the rain which falls directly onto the road.

It is well to bear in mind that too much water passing over the surface washes away the finer material which bonds the coarser and holds it firmly in place. By passing through the surface it reaches the foundation and softens it, so as to render it unable to bear up the load. We must consider the roadway itself as a roof which is to keep the water away from the foundation, exactly as the shingles on a roof prevent the ruin of the interior of the building. If the top surface be water-tight, we shall have a perfect road, as far as its ability to bear up a load is concerned. If we, at the same time, get a durable and smooth surface, we have got the most economical road we can build. If we are seeking a road which will be good during all seasons of the year, we must reject all material that is fibrous, or which absorbs water or does not let it flow off quickly. All loams and clays come under this class. They are good (if the traffic be light) when they are just moistened. During a long dry period they are all dust, and when it is wet there is nothing but mud. The fibrous nature of the material holds the water, and it evaporates instead of draining off. This is a slow process, and during the rainy season one evaporation is not completed before another wetting takes place, and we have a continuously muddy way.

The three materials which may be employed to obtain a water-tight roof are gravel, broken stone and pavement. The material to be used should be selected with reference to the volume and character of the traffic, and its applicaby the exposure and grade. When the cost of repairs on the cheaper material exceeds the interest on the excess of cost of the higher over the lower-cost work, then it is poor economy to retain the cheaper material and methods. This can only be determined by a study of the local conditions.

It is not our intention to touch on pavements, but we will discuss roads made of gravel and of broken stone. We have already said that the road must be a roof over the foundation. This roof has to serve the double purpose of keeping all water from the foundation and of affording a good smooth surface over which a loaded wagon can be hauled with the least expenditure of force. If a cubic foot of gravel be passed through screens of varying size of mesh, we shall find that what measured one cubic foot will have increased in size to a considerable extent. This will be even more perceptible if the finer screenings be placed at the bottom, with the coarser on top.

What we desire in a road is solidity, in order to get imperviousness. Whatever we do should be done with the end in view of placing our material in such a manner as to fill the void spaces in the coarse material as much as possible with the fine, and at the same time obtain an equality of hardness. If the gravel be dumped on a roadway from a cart just as it is taken from the bank, the coarser stone will roll to the outer edge of the heap while the finer will remain in the center. We thus get an uneven degree of texture, which will be more and more apparent as it begins to wear a little. A little labor expended in screening the gravel into say two grades will be of great benefit. If we first take out the larger stones, or what will not pass through a one-inch screen, we will get a better, because a more even, mixture. The larger stone will be arranged together, and furnish a solid foundation, while the finer gravel will simply fill the void in the coarse and bind the mass together. If this can be firmly rolled it will make a much better road than will the natural unscreened gravel, and at a price but very little greater. It must be remembered that sand is not gravel. Sharp sand cannot be made into a road. The more of such material to be found in any gravel the poorer is such gravel for road-building purposes.

Probably the best gravel for road-building purposes is the "blue gravel," which is made up of angular fragments of stone of varying sizes and a fine stone dust, with a slight quantity of clay, in the shape of fine powder. If the larger stones be removed entirely, and a little care be exercised in laying on the remainder, this makes a splendid road for all kinds of light travel and even a moderate amount of heavy. This gravel is found in banks which are very hard to work, and it is somewhat expensive to pick out and remove the larger stone. Of the rounded, water-washed gravel, that which has an excess of quartz in any shape is less valuable, as it is very brittle, and at the same time has no good bond. A slaty gravel makes a firmer and smoother road than the harder quartz, as there will be sufficient powder made by the action of the wheels to at all times give a good bond to the whole mass and make a smooth surface.

The main point to remember about gravel is to place the material in layers, with the fragments of each layer as near the same size as possible, the coarsest at the bottom, and bind them with the finer stuff placed on top. If this cannot be rolled, it should be carefully watched as it begins to compact, and all ruts at once filled, either by men with rakes or shovels, or by the use of a road-scraper. If the gravel ever compacts with hollows or ruts in the surface, it will be a very difficult matter to fill them so as to have a good, even road. The extra cost of this raking and leveling is but slight, while its effect is to give a smoother and more durable roadway. It is better policy to build less and to have it right than to cover a long stretch and have none of it good.

There are but few gravels which will make a good road. But, by careful manipulation, a comparatively poor gravel can be made to give fairly satisfactory results.

A Trip in the Yukon.

Some of the troubles that beset the miner in Alaska, or, rather, in the Yukon country, are thus set forth in a letter from E. A. Sather to Mr. Miller, at Juneau:

"I did not come back from the Yukon via Juneau as I intended, but went out to St. Michael on the steamer Arctic. My experience in the Yukon was not very lovely, but averaged with other inexperienced miners. As you know, I left your place the 9th of last April on the Chilcat, and crossed the summit on the 18th of the same month. Although the weather was favorable, we were snowblind and sorefaced when we reached Lake Bennett, and pulled down to Caribou crossing, where we camped and built our boats. After building our boats we had a good time hunting and fishing while waiting for the ice to break. The 30th of May we broke through the ice on Takau lake and went down the river as fast as we could get ahead. There were about 20 boats behind us. We had good luck until we had passed the White Horse, where we got stuck on the rocks and upset our boat. We lost some cooking apparatus, but saved most of our other stuff. We reached Forty Mile the 14th of June and went up to Franklin gulch, where the miners waited for rain; they had a dry season and did not make much. Miller and Davis creeks were very little better. Four or five claims in Miller creek pay very well, but the rest of them cannot scratch their grub stake. I did not work more than four days raking on the bars on Forty-Mile creek and made from $3 to $5 per day; then I got sick and had to pull out for St. Michael on the steamer Arctic which cost $30, and from there to Unalaska for $35, thence to San Francisco, $50.

"As a rule, the diggings in the Yukon are very low and will not average more than a bare living. I think there will be all of a hundred men coming out this fall, some over the summit and others down by St. Michael. Henkuk river is now the mining place; good diggings there. Mr. Bettles has started a trading post 600 miles up the river, but the diggings are 250 miles farther up still."

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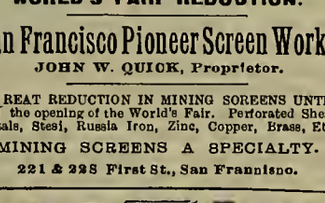

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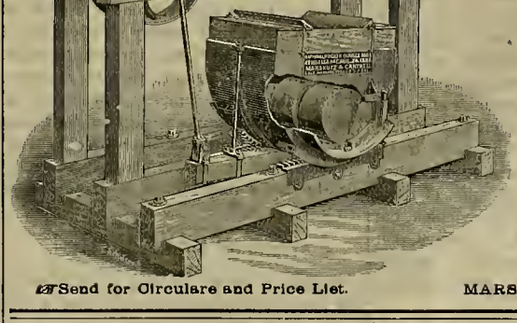

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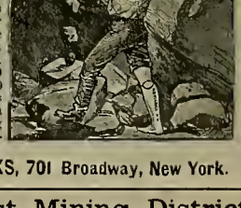

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Mechanical Progress.

The Paige Compositor.

It is claimed for the new Paige Compositor, a type-setting machine, that it does the entire work of composition, setting ordinary movable type with far greater speed, accuracy and artistic effect than has yet been accomplished by any method. The machine automatically distributes and at the same time sets the type indicated by the operator, automatically spaces and justifies the matter without mental effort on the part of the operator, places it in a galley ready for book or newspaper, as desired, records the number of lines set, and "leads" the matter when required. All of this is accomplished by means of positive mechanism. In an apprenticeship of less than 40 days, it is said, an operator has set 86,515 "ems" of solid, standard nonpareil in eight hours, an average of 8515 "ems" an hour. These figures are wonderful when one takes into consideration the fact that the average printer of to-day sets about 700 or 800 "ems" an hour, with his time of distribution also considered. The machine, as has already been said, distributes its type while it is also setting. The machine is run by one-twelfth horse-power, and is now in private practical operation.

"I can print," says Mr. Paige, "a 200-page book, at a cost of $5, in 20 minutes. The operator has only to watch the keyboard and copy, and the machine will do the rest. An operator can average three or four characters at each touch of the keys, and this machine is the only one in the world for which there is no excuse for an error in proof."

The Sun Furnace.

Sir Henry Bessemer's sun furnace, says *Industries and Iron*, is an erection which was possibly well-nigh revolutionizing the world, let alone the science of metallurgy. It was to attain a temperature of nearly 60,000°, and therefore fuse anything and everything; and I was assured that it would have achieved its object but for the stupid fault of an Essex lens-maker. The "sun furnace" consists of a wooden building 35 feet high and some 12 feet square. A few feet from the ground a large inclinable mirror for catching the rays of the sun is fixed; the rays are reflected from this mirror on to a number of powerful superimposed lenses above, which, by a simple arrangement, were to throw the enormously concentrated rays upon whatever object might be in the crucible below. Such was the mighty plan, but the manufacturer of the upper glasses, instead of turning them out uniform, made them all differeot, and thus the focus was spoiled. The work and anxiety in connection with this sun furnace was so great that its deviser did not care to go over the ground again, and there the peculiar furnace remains—a remarkable monument of what might have been.

Welded Seams in Plates.

In concluding an interesting paper on "Welded Seams in Plates," before the recent engineering congress at Chicago, in the marine and naval engioeering division, Warren E. Hill, vice-president of the Continental Iron Works, said: In the opinion of the writer, the time is not far distant when the shells of boilers or vessels, similar to those used by our transatlantic steamers and our United States Government cruisers, will all be constructed without the use of rivets or calking. Thus the full advaotages of the method may be realized, because, as can be easily proven, the welded portions of the structure are of the same value in tensile strength as any other portion of the material of which the vessel or boiler is constructed. When welded boilers come into more common use, and experience shall overcome the prejudices which to some degree obtain against them, then steam boiler shells may be lightened in proportion to the difference which common practice now allows as against boilers having riveted joints, for, aside from the weakness of riveted joints, and even with metal of the same thickness as required for riveted work, the weight of butt straps and rivets will be dispensed with.

A New Bearing.

A new bearing which has been introduced lately, to a considerable extent, in foreign engineering construction, is formed of a plumbago, or graphite, mixed with a certain quantity of steatite, a combination by means of which the soft plumbago is hardened so that it may be moulded into any desired shape, and turned or worked to fit any kind of a box. As described in *Machinery*, this mixture, which is compressed by a hydraulic press, and afterward baked, is slightly heavier than carbon, but much more tough, and is said to be adapted for use under heavy shocks, and the advantages of thus doing away with oiled bearings, in many instances, are declared to be so great that some loss of power in securing them is amply compensated for. Special account is made of the fact that the co-efficient of dry bearings is practically constant, and the friction can be allowed for in designing the motive-power to run the machinery, whereas the friction in a lubricated bearing varies according to the quality of the lubricant and the attention paid to oiling. Bearings made of lignumvitæ seldom last long without requiring to he renewed.

A Cheap and Effective Projectile.

Press dispatches from Washington City, Sept. 26th, state that a solid projectile, fired through 17 inches of steel armor plate at the Government proving station at Indian Head, came out unharmed. It is considered by officials of the Naval Ordnance Bureau the most satisfactory test yet made.

The projectile was impelled with a velocity of 1800 feet, and with a striking energy of over 12,000 tons. It not only passed through the heavy steel plate, but two inches of wrought-iron backing. The different shells and projectiles tested were those for 6, 8 and 12-inch rifles. The shells made of the Holtzer and Carpenter type are very expensive, and the department determined to secure, if possible, a cast-steel shot instead of the forged-steel pojectiles now made.

One year ago a contract was made with a New York firm for 400 10-inch and 100 12-inch cast-steel shot, and the acceptance of the test of some of them seems to prove that the navy has found a cheap as well as an effective projectile.

Edison on Flying Machines.

Once I placed an aerial motor on a pair of Fairbank's scales and set it going, says Thomas A. Edison. It lightened the scales, but it didn't fly. Another time I rigged up an umbrella-like disk of shutters and connected it with a rapid piston in a perpendicular cylinder. These shutters would open and shut. If I could have gotten sufficient speed, say a mile a second, the inertia or resistence of the air would have been as great as steel, and the quick operation of these shutters would have driven the machine, but I couldn't get the speed. I believe that before the airship men succeed they will have to do away with the buoyancy chamber.

New Material for Cog Wheels.

A process has been discovered by a German mechanic for producing, through the combination of rawhide and a composition of his own, a new material adapted to the manufacture of "cog and friction wheels," which is considered likely to do away in many cases with iron and other metals, besides offering additional advantages. It is claimed that this new material not only insures the noiseless working of machinery, but also that teeth made from it are more durable than metal.

The Manufacture of Heavy Guns.

The manufacture of the immense guns required for modern service is a most interesting process, says *Machinery*. The rifled guns are made by re-enforcing the tube with rings and repeated layers of steel called pockets, which are fitted one over the other over the original tube or barrel of the gun. The exact size of the jacket and ring when heated so that it can be put in its place must be a matter of the nicest mathematical calculation. The powder makes such havoc with the rifling of the largest guns that 100 charges are about all that can be expected from them. The jackets and rings can then be removed and fitted to another tube. The various parts of the gun are not put together at the foundry, but are sent to a department of the arsenal called the assembling room, where the tube is rifled, and the gun is finally completed. A steel gun of the largest calibre costs about $90,000 to $100,000.

New Abrasive Material.

Carborundum is a new abrasive material placed in the market for the various uses to which emery, or corundum, is applied. It is a definite compound, atom for atom, of carbon and silicon; a true silicide of carbon or a carbide of silicon. The name carbo-silicon would have been more scientific and appropriate. The appearance and properties of this substance are more nearly those of the diamond than of corundum, the luster being highly vitreons and adamantine, and the hardness being extreme, sufficient in the form of a rapidly-rotating wheel to cut the hardest steel and corundum crystals, and the material is said to have been used with success in polishing diamonds.

Not "Monkey Wrench."

Many persons wonder why the monkey wrench received such a name and imagine it must have a connection io some remote way with the animal from which its curious designation seems to be derived. In fact, its name is not monkey wrench at all, this being a corruption of the title originally given it.

It was invented by Charles Moncky of Willlamsburg, N. Y., who sold his patent to a firm who undertook to manufacture and put it on the market. In honor of the inventor they called it Monck's wrench, but both they and he were soon much disgusted to find it known as a monkey wrench.

Signalling by Light.

A new apparatus termed the telephote intended for signaling at sea by night has been brought out by an engineer resident at Vienna. There is an aluminum mast from 10 to 30 feet high, a battery or dynamo, a cable of electric wire, and a transmitter keyboard of 37 keys. On the mast are arranged 106 incandescent lamps, which can be manipulated to form the signs of the Morse alphabet. Seventy-two letters a minute, it is stated, can be shown on the telephote, clearly visible three miles in daylight and ten miles at night.

Aluminum for Piano Plates.

It seems probable that the piano plates of the future will be largely composed of aluminum or of aluminum alloys. The present plates are, in many respects, admitedly deficient. Insensibility to vibration and heaviness and density required in the casting for the attainment of a certain tensile strength, as compared with aluminum, are obvious drawbacks which platemen and piano-manufacturers hitherto apparently looked upon as conditions from which that branch of foundry work was inseparable.

Scientific Progress.

Submarine Photography.

Several of the difficulties experienced in endeavors to ascertain the natural relations of objects existing at considerable depths under water have been overcome by M. Louis Boutan, in a remarkably ingenious manner, and the contrivances he adopted are described in a recent communication to the Paris Academy of Sciences, writes John Humphrey of London to *Science*.

He prefers to use a small camera in which several plates can be exposed consecutively, and encloses this in a rectangular, water-tight metal box, into the sides of which plates of glass are inserted to serve as windows. The camera can be so disposed that the lens may face all the windows in turn, if desired, and exposures are regulated from outside the metal case. To avoid any ill effects that might be caused by differences in the internal and external pressure when the apparatus in sunk io deep water, a kind of balloon filled with air is connected with it. As the pressure increases, in descending, the balloon is compressed, extra air is thus forced into the box, and the pressure on its wall equalized. A stout foot to support the apparatus and weights to sink it complete it for practical purposes.

In water near the shore, not greatly exceeding one meter in depth, the apparatus can be conveniently fixed, without the operator needing to enter the water, and, by direct sunlight, good negatives can be obtained in ten minutes. When the water is deeper the operator must descend in diving costume to fix the case securely on its stand before commencing the actual work of photography. In calm, bright weather, photographs can then be obtained by direct sunlight in from 30 to 50 minutes. Colored glasses, preferably blue, must be interposed between the objective and the water, in order to obtain sharp images.

By the use of artificial light to illuminate the surroundings, however, matters are still more simplified. To this end, M. Boutan has contrived a special magnesium lamp. A cask of 200 litres capacity is filled with oxygen gas, and on its upper end is fixed a spirit lamp, which is covered by a bell glass. A vessel containiog magoesium, in powder, is connected with this lamp in such a manner that the metal can be projected across the flame by the action of a rubber ball which serves as bellows. The oxygen gas, of course, is intended to assist combustion, and the lamp having been lighted and covered by its protecting globe, the cask simply reqnires weighting to sink it.

Good instantaneous negatives have thus been obtained by M. Boutan during a violent storm, when no daylight could penetrate the depths. They are lacking, as regards background, but this he attributes to imperfections in the apparatus, particularly the objective. He also found it necessary to place before the lens a diaphragm of very small aperture to secure a sufficient degree of sharpness. If a formula were calculated for an objective, the front of which might be exposed to sea water, he thinks these drawbacks might be remedied.

As it is, he has proved that photographs can be taken in a brief time uoder water, in calm weather, by direct suolight, at depths up to six or seven meters; whilst, by the use of his special lamp, they can be taken, instantaneously, at any depth that can be conveniently reached by a diver, and the state of the weather is of no importance.

A New Lens.

Dr. Goerz of Berlin has iovented a new double anastigmat lens, which was recently described and showo by him before the Photographic Society of Great Britain. From its large aperture this leos is entitled to rank as an aplanat; it is free from astigmatism, and even with a large aperture it has a field

that is quite flat. These valuable properties should insure its success when it comes to be introduced commercially in this country, says the Chicago *Journal of Commerce*. Its great advantages can, we are told, only be fully appreciated by a comparison of its work with that of other lenses formed of the Jena glass.

Mr. Edison's Coming Invention.

A correspondent of London *Machinery* has received the following interesting particulars from Mr. Thomas A. Edison: "I am at work on an invention which I may now say will be a success, and which, while its commercial value will be very limited, may recommend itself to my friends as something curious. It is not yet complete, but I am vain enough to believe it will surprise you. I hope to be able to combine the phonograph and the camera, and not only reproduce the sounds accompanying an event, but the actions of those taking part as well. For instance, if Madame Adelina Patti should be singing, this invention will put her full length picture upon canvas so that the expression of her face and the pose of her body can be seen while listening to the song she has sung. The eye will be pleased as well as the ear. The invention has demonstrated its practicability at a prize fight. I reproduced the ring, the two principals, the crowd about them, the intensely interested expressions of all, the sound of blows, the cheers of encouragement and the howls of disappointment. My idea is that a man, sitting in his library at home, may be able to see reproduced upon his wall the business of the stage as well as the lines of the actor.

The Deepest Sea-Sounding Again.

"The deepest sea-sounding on record" has again been made in the Pacific ocean, this time by the United States fishery steamer Albatross. Telegraphic advices from Victoria, B. C., September 23rd, say:

"The United States fishery steamer Albatross has had a very successful season. While in the neighborhood of Bering sea the scientists found time to materially investigate submarine life. She also made the deepest sounding ever made in the world. Tremendous weights attached to steel cables were lowered to a depth of 4500 fathoms, off the coast of the Alaskan peninsula. At a depth of 2800 fathoms in another place excellent specimens of phosphorus fish without eyes were secured. In all, sufficient fish and weeds to load four cars were taken."

As stated in this department on September 16th by John Partridge, Secretary of the Geological Society of the Pacific, in 1874 the U. S. S. Tuscarora, Capt. Belknap, while surveying for a cable bed, only about 100 miles off the coast of Japan, played out 4643 fathoms of wire (27,858 feet) without finding bottom; then the wire broke. In the same region bottom was afterward found at 4655 fathoms.

The Harvest Moon.

Most people know that the moon hastens her time of rising during the evenings of the harvest moon, but why this is so few have ever asked, says Orrin E. Harmon in the Seattle *Post Intelligencer*.

A complete mathematical explanation lies beond the limits of this article, but a simple illustration will explain the principle:

Take a rod five feet long and immerse it in a body of water whose surface is tranquil. When the top of the rod is just at the surface of the water draw the rod out of the water at the rate of one foot each second, keeping the rod in a vertical position. Clearly it will take five seconds to lift the rod out of the water.

Again place the rod in the water and so incline it that the lower end will be three feet below the surface of the water when the upper end is on a level with the surface. In this position raise the rod out of the water at the same rate as before, keeping the direction of motion vertical. With the rod so inclined it will take only three seconds to raise it ont of the water, and the time will be shortened in proportion as the rod is inclined to the surface of the water.

In this illustration the rod represents the position of the moon's path which she describes between two successive risings, and the water surface represents the plane of the horizon. If, then, we see the moon on the eastern horizon to-night, at the same time to-morrow night (the moon having advanced eastward) she will be below the horizon, and the time required for her to come to the horizon will depend upon her distance below the horizon, and this in turn will depend upon the inclination of her orbit to the horizon. This inclination is very changeable and depends upon, first, the latitude of the place; second, the place of the moon's nodes on the ecliptic; third, the inclination of the ecliptic to the horizon, which depends upon the time of the year as well as the time of day.

Degrees of Hardness.

The following table, by Prof. Prestwick, of the relative hardness of certain minerals is worth noting for reference:

Talc, laminated	1
Selenite	2
Mica	2 5
Calcite	3
Fluor spar	4
Quartz	7
Corundum (sapphire and ruby)	9
Diamond	10

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Table of Contents.

The following brief abstract of the contents will give an idea of the branches of the subject treated:

General Plan; Discussion of the Principles of Hydraulics; Rules Deduced from Formulæ Obtained; Examples and Calculations; Extensive Tables for Ready Reference; Fundamental Laws of Hydraulics Demonstrated and Expressed in Formulæ and Rules; Flow of Water through Openings; Weir Coefficients; Triangular Weirs; Flow of Water Over Quadrant Weir (tabulated); Application of Tables; Submerged Orifices; Flow Through Orifices in Thin Partitions; Tables and Applications; Miners' Inches; Tables and Calculations; Flow of Water Through Short Tubes and Compound Tubes; Flow of Water Through Pipes; Tables of Velocities and Cubic Feet Flows for Given Fall per Mile and Diameter of Pipe; Coefficient for Bend—Circular and Angular; Flow Through Nozzles; Inverted Siphons; Flow of Water in Open Channels; Extensive Tables; Rough and Ready Notes; Hints for Speedy and Approximate Estimates, etc.

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FROM THE LABORATORY OF THOS. A. EDISON,
ORANGE, N. J., Sept., 24, 1893.

DEAR SIR.—I have read the MS. of your "A B C of Electricity," and find that the statements you have made therein are correct. Your treatment of the subject, and arrangement of the matter, have impressed me favorably.

Yours truly,
THOS. A. EDISON.

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By J. S. PHILLIPS, M. E.

The work is divided into four parts—Rocks, Veins, Testing and Assaying. The geological chapters are intended to give miners a practical idea of the various formations. The chapters on mineral veins are derived from long observation, and the section on exploration has been carefully considered. All that relates to discrimination and assay of minerals has been kept as free from formulæ as possible. The work is written for pract cal men, and all the explanations and descriptions are clear and to the point. It is so prepared that it is useful to uneducated men as well as scientists.

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Electricity.

Long-Distance Transmission.

The three phases of the application of electricity may be termed successively lighting, traction and long-distance transmission. The two first have been pretty thoroughly considered and applied, but the third is yet in an experimental stage. It is one of the most prominent questions that confronts the electric engineer to-day, and, though this phase of the problem is considered the simplest theoretically, it is likely to prove the most awkward practically. It is impossible in the present state of the science to prescribe either a direct, simple, alternating or multiphase current as a general solution of long-distance transmission, and it is not improbable that each of these systems will find application in various places, according to their individual requirements. Discussing this subject, *Electricity* says:

"The multiphase current, being the latest development, is at present attracting a monopoly of the attentions of electrical engineers, and at first sight the peculiar properties which it possesses make it specially adapted for both lighting and power, but multiphase motors are as yet comparatively new, and the test of time is needed, as well as a more extensive use, to determine the efficiency and practicability of multiphase systems. The simple alternating current, while giving a good efficiency, is handicapped for the want of a self-starting motor under load, which puts this system at a disadvantage for a general distributing plant. It has been successfully operated, however, in the case of mines and other places where a special starting device was used for the motors.

"The direct current system has been largely lost sight of in discussing long-distance transmission, but there are many engineers who believe that high-tension, direct-current machines will nevertheless play an important part in long-distance work. For large motors and street railway work the direct current is as yet almost indispensable, and there can be no question but that much higher working pressures than are now in general use are perfectly feasible. In an address by Prof. Crocker, he points out that raising the voltage of these machines to 5000 and even 10,000 volts is quite possible with sufficient care in the matter of insulation.

"The commutator is of course the great bugbear in machines of this sort, and in general the trouble at that point will prevent the use of a single machine of such a high voltage as would be required for a very long line, but connecting several machines in series would largely overcome this difficulty.

"In the matter of transformation the direct current is still at a disadvantage compared with the alternating, and it is obviously impossible to use a pressure of several thousand volts for the service of small consumers. For local distribution the use of direct current transformers would be imperative, but these dynamotors can be built to reach an efficiency of 90 per cent or more, and in this way a certain proportion of this current could be economically distributed for small customers.

"While the voltages mentioned seem at first sight to be impracticable, it must be remembered that in arc-light work 60 and 80 light machines are in general and successful use, generating from 3000 to 4000 volts, and, while in most places alternating and multiphase currents will perhaps be found the most practical, the advantages of a direct current for many kinds of work render its application to long-distance transmission worthy of more study and experiment than it has yet received."

Sealing Electrodes in Bulbs.

A novel application of electric welding is said to have been made with the result that wires of the base metals can be united to glass by fusion without previous oxidation, says the *Optician*. The tube in which the wire is to be fused is first made as small as possible. The wire is then inserted and the tube is exhausted of air. An electric current of gradually increasing strength is passed through the wire, and, as this heats up, the air occluded in it is evolved and drawn away. Finally the tube becomes softened, either by heat radiated from the wire or by the application of a blowpipe flame to its exterior. When this takes place the glass falls in upon the unoxidized surface of the metal. In practice the method of procedure has to be varied in different cases, but there is nothing that calls for further explanation to those who are skilled in the manipulation of glass.

Electricity at the Midwinter Fair.

One feature of the proposed Midwinter Fair in this city that will be particularly novel and pleasing will be an electric tower, which will rise in the center of the grand court to a height of 266 feet. At night it will be ablaze with the colored electric lights gleaming and ever changing in the darkness. The first and second floors will be for music. Elevators will be used, and visitors may ride in them to a height of 230 feet.

The tower is to be of iron. It is of interest to know that a local firm has received the contract to build it—J. K. Firth.

The great tower will be but a single feature of the electric illumination of the fair. The different electric-light companies who have established agencies in this city are already making arrangements to provide for the practical and ornamental illumination of the exposition.

In the matter of ornamental illumination, some startling effects are suggested. As the plan stands now, every building will be outlined in light. Electric globes of different colors will give a beautiful and striking effect. All of the main buildings, each of the concessions and every structure on the grounds will have its borders lit up by electric fires.

An electric fountain is planned. Luther Stierenger, the consulting engineer of the Columbian Exposition, will make the design. The electric fountain is to be elaborate in the extreme, and will have all that electricity can show in the way of light—fantastic, practical and ornamental.

An Ingenious Dynamo.

An ingenious dynamo has been invented for the purpose of facilitating the work of jewelers, bicyclers and students in plating, and experimenters and small platers will find it equally useful. The dynamo is a regular machine of high efficiency. It is cast on an iron pedestal with an arm extending for the support of the saddle and the hubs, in which the main bearing runs. The machine has a regulation bicycle saddle with spring adjustments and an adjustable saddle post, and either a child or the tallest man can, after mounting the saddle, operate the machinery by working the pedals after the manner of the ordinary cycle.

Electric Coal-Cutting.

Electric coal-cutters are now largely in use in the bituminous mines. In the machine most employed the coal is undercut by means of bits set in a rotary bar on the end of a sliding frame, which is fed into the face of the seam. Other cutters are constructed with a sprocket chain to the links of which are affixed cutting tools. Machines of this kind, says *Electricity*, can be fed either in or along the face of the coal for long-wall or room working. In both of these the electric motor is built into and forms part of the frame, adding but little to its weight. In exceedingly hard or pyritiferous coals, which cannot be cut with a continuously moving cutter, an electric pick machine is advantageously used. This also has the advantage of giving a kerving wider at the front than at the back of the cut, which allows the coal to fall outward and more lump coal to be gained. The motor draws a projectile back against a spring, and, releasing it, lets the pick fly against the face of the coal at the rate of 150 blows a minute. Electric drills for putting in holes, for blowing down coal after it has been undercut or from the solid, as is done in anthracite, are also used. Mounted on a column a machine of this kind is free to drill in any direction from horizontal to vertical. A drill of this type, of 100 pounds weight, will easily drill a 1½-inch hole at the rate of six feet per minute in hard or soft coal.

Fishing by Electricity.

An apparatus for fishing by electricity has been introduced, consisting of a large iron frame interlaced with netting, which can be opened and closed at the will of the operator. An electric light encased in a lantern is lowered into the net, the electricity being furnished by a motor in the bow of the boat. As the boat moves along the network is thrown open, and the bright light of the lamp, which is seen at a great distance in the clear water, arouses the curiosity of the fish, which swim into the trap.

An Electric Captive Balloon.

One of the attractions at the International Exhibition in Antwerp next year will be a captive balloon, worked and lighted by electricity. It will be capable of accommodating 40 people and of rising to a height of 1500 feet. The balloon is the invention of a Belgian officer of engineers, and trials with it have proved so satisfactory that the ballooning corps of the Belgian army is constructing a similar one, but smaller, for military purposes.

Useful Information.

Hygienic Treatment of Sprains.

Sprains are so common that their treatment should be well understood. While all cases are not to be treated exactly alike, yet the general principles are the same in most instances, says the *Journal of Hygiene*. The method we can recommend as most efficacious is somewhat as follows:

The injured part or joint is immersed in very warm water as soon as may be after the injury, in order to dilate the superficial vessels for a few minutes. After this, massage should be practiced, above, below and around the injured part, then gradually approached and a very gentle stroking is applied to it. After that, a little more vigorous friction is practiced. Insensibility is thus gradually produced. When partially obtained, a more or less energetic *kneading* is practiced, according to the varying degree of sensibility experienced by the patient, but pain should not be caused. To the massaged part is finally applied a compressive bandage, with wadding, which is wrapped in a flannel or linen band. If the sprain occurs in the inferior limbs, the practice of avoiding movements for a shorter or longer period is not advised, but the patient may use his limb to walk as soon as he can do so without feeling great pain. Walking promotes the venal and the lymphatic circulations by the muscular contractions, but if much pain is caused it should not be long continued.

The Greater Intemperance.

We talk about temperance as though abstinence from alcohol were the fulfillment of the law, but there is a greater temperance yet to come, more in accordance with the dictates of an enlightened reason, says the *Journal of Hygiene*. There is more than one kind of intemperance, and a modicum of observation would show that disgraceful outward conduct by no means gives the full measure of danger that menaces society. The sin of overeating produces as much or more trouble to the community as that which comes from the use of alcoholic drinks. The use of tobacco is the occasion of harm second only to that of alcohol. The evil wrought by the excessive use of coffee is by no means one of the minor ones. The baneful effects of the coffee habit in Brazil are equal to that of the beer habit among the Germans. The use of opium and other narcotics is another fruitful source of injury to the community. The evils of overwork and worry do not fall far behind. In fact, we exhaust ourselves every day; in our work and in our play, in eating and drinking, and even in those athletic efforts that are supposed to be hygienic and recuperative. They are all made too intense, and therefore we do not live out more than half of our days, and that half we do not live either comfortably or with that fullness and richness of life which we might. Furthermore, these very excesses are the occasion for much of the demand for alcohol to drown the nervous rebellion that would otherwise shield us from the result of our own foolishness. In confirmation of this, look at the immense amount of disease that runs riot throughout our land.

Mental Kitchen Scales.

Ten common-sized eggs weigh one pound.

One pint of A coffee sugar weighs 12 ounces.

One pint of best brown sugar weighs 13 ounces.

Two teacups, level, of granulated sugar weighs one pound.

One and one-third pints of powdered sugar weighs one pound.

One pint, heaped, of granulated sugar weighs 14 ounces.

Two tablespoons of powdered sugar or flour weigh one ounce.

Two teacups of soft butter, well packed, weigh one pound.

One quart of sifted flour, well heaped, weighs one pound.

Four teaspoons are equal to one tablespoon.

Teaspoons vary in size and the new ones hold about twice as much as an old-fashioned spoon of 30 years ago. A medium-sized teaspoon contains about a drachm.

Miss Parloa says one generous pint of liquid, or one pint of finely-chopped meat, packed solidly, weighs one pound, which it would be very convenient to remember.

Influence of Climate on Race.

The Anglo-Saxon race is at present trying, on a magnificent scale, an experiment which has never been similarly tried before, viz., the capacity of a vigorous conquering and colonizing stock to extend itself through countries the most diverse in all the conditions that affect most powerfully health, vigor and reproductive faculty. But can a race that grew to its full stature among the marshes of the Baltic, the fiords of Norway and the humid hills and dales of Britain hope to retain that vigor on the sweltering plains of India or Australia or in the ice-bound wilds of Canada? Will a new type of Englishmen finally evolve itself in Florida, in New South Wales and in Bechuanaland? Will the Anglo-Saxon ever remain vigorous and fertile within the limits of the tropics? These are vast questions, on the answer to which great destinies hang, and we can hardly evade them any longer on the ground that no materials for a solution exist. Some materials, inadequate and incomplete no doubt, do exist and are constantly accumulating. Let us look at a few of the facts brought forward in the article before us.

The writer takes the case of Barbadoes, "the oldest and healthiest of our tropical possessions." There, he says, the observer

"will see some people known as the 'mean whites,' men and women of blood as pure as his own, whose progenitors have lost through poverty the luxuries and advantages which, with constant infusion of fresh blood, alone keep the whites alive there. He can notice at the same time the insolence which the consciousness of physical superiority has bred in the descendants of African slaves." As an example of a very opposite type, the writer takes New Zealand. After pointing out what is so constantly forgotten, that the position of New Zealand in the Southern Hemisphere corresponds rather to that of Italy than Great Britain in the Northern Hemisphere, he gives his opinion that in New Zealand "the people are undergoing a rapid process of alteration—are becoming, to coin a word, dis-Englished in respect of mental characteristics." They are losing the melancholy, restlessness and anxiety said to be characteristic of Englishmen, and are becoming cheerful and light-hearted, like the southern races of Europe. Further, by reason of the absence of a hard winter severe struggle with the elements, and through high wages and abundance of food, the New Zealander tends to become easy-going, pleasure-loving and optimistic.—Lancet.

Facts about Metals.

Spain is one of the principal copper-producing countries.

The tin production of the world in 1891 was 69,963 tons.

The annual production of gold and silver is about $200,000,000.

The United States produces 35 per cent of all the lead of the world.

Galena, or lead ore, always contains silver in greater or less quantities.

Copper is said to be found in over 16,000 localities in the United States.

In 1888 the United States produced 160,000 tons of lead; the world, 297,000.

By improvement in machinery, one man now raises more ore than four men could in 1800.

In 1889 the United States produced 103,000 tons of refined copper, nearly one-half of the world's yield.

About 60 per cent of the copper produced in this country comes from the Lake Superior region.

The United States produces 31.4 per cent of all the iron ore in the world and 34.1 of all the pig iron.

The world's coal fields already known and worked contain coal enough to last for a thousand years.

The "Longworthy crevice" near Duhuque has produced, it is said, nearly 10,000,000 pounds of lead ore.

The mines of the world produce every year 540,000,000 tons of ore, etc., of which the United States produces 160,000,000 tons.

The most important lead regions of the United States are in the Mississippi valley, one being a district in Wisconsin, Illinois and Iowa; the other in Missouri.

The United States leads the world in the production of iron, in 1890 producing 10,000,000 tons of ore and 9,202,703 tons of pig iron, Great Britain coming next with 13,000,000 and 7,904,000 tons respectively.

In the 88 years from 1800 to 1888 the world mined 7942 tons of gold, 95,559 of silver, 84,900,000 of copper, 34,600,000 of lead, 31,500,000 of zinc, 1,430,000 of tin, 1,273,000,000 of iron and 10,601,000,000 of coal.—Exchange.

Paper Bottles.

The paper-bottle works at Glassboro, N. J., have shut down, and it is rumored that operations will not be resumed. This establishment is the only one of its kind in America, and with the closing of the doors a unique industry will be abandoned, says the Philadelphia *Times*.

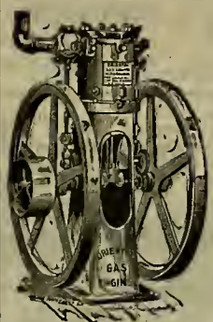
Paper bottles are comparatively a recent invention, and their market is limited principally to two-ounce ink bottles. They are largely used in export trade, where duties are levied according to gross weight, as they only weigh one-third as much as glass, and are non-breakable. The bottles are made by machinery, and but little labor is required in their manufacture.

A Chicago ink manufacturer began some years ago to experiment, first making wooden bottles and afterwards paper bottles lined with a water-proof composition. The present company secured the patent and set up an establishment to place the bottles on open market.

Use for Eucalyptus Leaves.

The Madras and South Indian Railway Companies have been making experiments with a decoction of eucalyptus leaves as a disencrustator for locomotive boilers. The experiments are said to have proved so highly satisfactory that further tests are now being made by the Madras Company with a view of practically utilizing this decoction.

THE ORIENTAL GAS ENGINE



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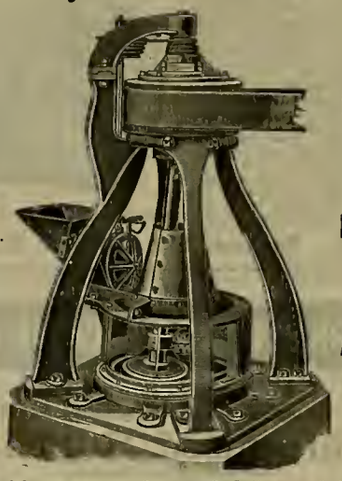

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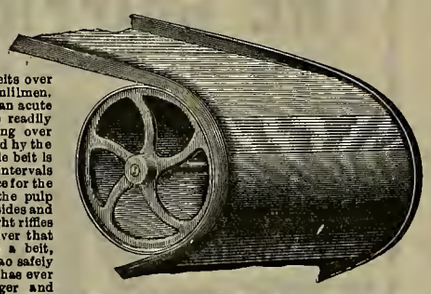

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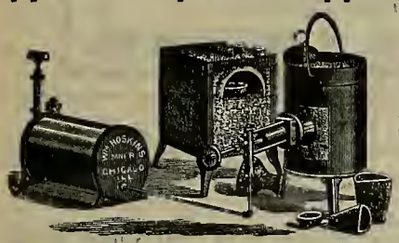

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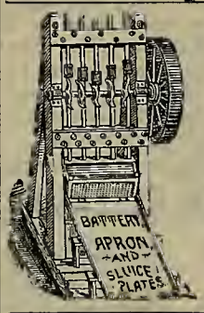

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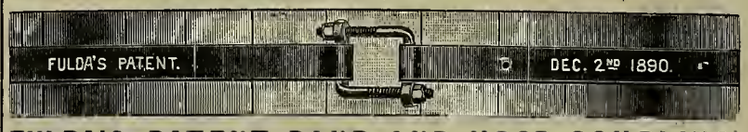

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Delegates to the Miners' Convention.

Delegates to the third annual convention of the State Miners' Association, Monday, October 9, 1893, have been reported to Secretary Ralston from seven counties. Seven more are to report. The list to date is as follows:

CALAVERAS.

C. Barger, D. G. Cameron, J. Copeland, Willis Dunbar, S. Foorman, C. D. Lane, S. S. Moser, G. W. Roberts.

BUTTE.

C. C. Belding, J. C. Boyd, Lewis Burwell, L. Cohn, W. E. Duncan Sr., W. E. Duncan Jr., A. Ekman, C. P. Farnham, N. A. Harris, W. J. Hessiro, John Hensley, W. S. Higgins, L. J. Lewis, L. L. Myers, Frank McLaughlin, B. L. McCoy, R. M. Mores, C. J. Nickerson, D. K. Perkins, E. C Pasdon, G. W. Price, H. V. Reardon, E. W. Slater, Dr. Servis.

NEVADA.

E. K. Abadie, A. Allen, C. J. Brand, A. Burrows, A. S. Bigelow, N. P. Brown, J. M. Buffington, A. S. Beghie, James Bennallback, W. Cole, L. S. Calkins, E. C. Creller, E. Coleman, J. Coleman, O. K. Clondman, P. Campbell, C. E. Clinch, C. K. Clarre, T. Carr, A. B. Dibble, C. Davis, E W. Donnelly, W. A. Dennis, S. P. Dorsey, A. B. Dohble, D. Douglas, W. F. Engolbright, C. D. Esstin, F Elleman, George Fletcher, P. Foley, T. S. Ford, John Fippin, George Grant, J. S. Goodwin, O. Gowell, L. P. Goldstone, John Glasson, M. M. George, A. Ganls, C. Grimes, S. Grayner, C. Helwig, J. Hussey, C. F. Hegerty, A. Isoard, F. Ingram, C. O. Jepson, W. Jenkins, J. J. Jackson, P. Johnstone, C. E. Johnstone, J. F. Kidder, J. Knotwell, C. Keth, J. M. Lakeman, D. McPhetres, J. S. McBurde, J. F. McCall, George McLean, J. McBean, J. D. McIntosh, C. T. McGlashan, M L. Marsh, Chris Mallon, N. C. Miller, J. Morgan, A. Mathman, W. H. Martin, A. D. Masson, F. Nillon, J Northway, M. F. Prisk, J. Pridgeon, E. M. Preston, H. Place, A. Ranch, J. J. Rolfe, J. Robinson, J. Reston, P. Riley, A. J. Ridge, W. P. Rossen, G. C. Shaw, C. J. Sims, F. Searles, H. S. Spaulding, B. N Sholcraft, W. T. Shockley, A. Stoddart, C. Stocks, R. Skidmore, F. Snell, J. Kewes, R. A. Thomas, A. Tredidgo, A. Tully, M. C. Taylor, T. Weltzel, W. W. Wagoner, J. M. Walling, F. E. Wadsworth, R. A. Walker, J. Welshurn, L. Wheeler, R. G. Walrath, E. Worthy, Frederick Zeltler.

SISKIYOU.

R H. Camphell, James Camp, John Daggett, T. Demming, A. G. Myers, Charles Roberts.

TRINITY.

F. Beaudry, T. E. Jones, O. M. Loveridge, John McMurry.

PLACER.

G. W. Applegate, Joseph Ashburn, H. F. Albee, F. H. Bell, A. Breece, J. Burns, J. P. Burchard, J. M. Barton, L. Bulens, John Butler, F. E. Colhurn, A. B. Campbell, J. W. Chlun, R. H. Cuff, G. C. Caker, H. Disque, John Dysart, J. E. Doolittle, R. De Kruse, H. Delrae, A. Dolt, J. R. Dyer, J. Damsguar, I. A. Dixon, E. T. Earley, J. M. Fulweller, J. A. Filcher, Henry Ford, J. Findley, H. H. Grinnell, E. B. Gilbert, W. F. Green, W. R. Gleason, J. Gilbert, B. F. Hartley, C. F. Hoffman, T. Herrmann, A. Harrison, E. L. Hubbard, J. H. Huth, T. Hanlon, G. B. Hewes, T. W. James, J. O. Jones, D. W. Kennedy, Charles Kennedy, W. B. Lardner, M. J. Lawrence, W. A. LaRue, S. C. Laird, A. McKinley, J. B. Meredith, George Marthen, E G. McKinstry, John McAninch, R. Monroe, John McDonald, George McAuley, C. F. Macey, J. Mullen, E. W. Maslin, W. Muir, G. E. Mitchell, W. R. Monaghan, H. V. Martin, J. H. Mariner, J. H. McKeown, J. H. Neff, J. Nicholls, John Papa, E. Politka, W. D. Perkins, L. Remier, W. H. Robinson, D. Russell, James Rea, W. W. Rodehaver, John Roswell, A. Rucknell, A. Rogers, J. L. Stoakes, G. W. Snyder, H. Simmons, C. M. Sprague, F. L. Sinders, R. M. Sparks, M. Schnabel, W. Sweasey, F. P. Tuttle, W. B. Thorpe, R. Thomas, A. Towle, F. S. Woodward, C. White,

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Coast Industrial Notes.

—The oew town of Hartford Junction, near Snohomish, Wash., has been wiped out hy fire.

—Herr Jenson, of Holstein, Germany, has hegun the manufacture of bricks in Whittier and is now turning out 25,000 daily.

—The bark Guteobeck cleared for Liverpool from Victoria, Saturday last, with the first salmon cargo of the season, consisting of abont 39,000 cases.

—Conoection has been made at Spokane with a loog-distance telephone, extending from Spokane to the Puget Sound cities via Portland. It is a complete success.

—The Imperial Clothiog Company, the largest establishment of its klnd ln Spokane, has gone ioto the hands of a receiver. The liabillties are $105,000 and the assets are much helow this figure.

—A fire in L. L. James' lumher yard at Napa occurred last Saturday. James & Co. estimate their loss at $20,000 to $25,000 and are insured for $10,000. Mr. Knapp lost about $5000, with no insurance.

—A fire hroke out at Turlock, Cal., Monday eveniog at 10 o'clock, destroying the business portion of the town. It took the whole hlock on Froot street, includiog the store of L. Stranss & Co. The loss is $50,000.

—Lawyer Cromwell, counsel for the receivers of the Northern Pacific, announces that they have not funds enough to justify them in meeting the interest on $19,328,000 6-per-cent second mortgage bonds, due October 1st, hut hope soon to he able to do so.

—The Duniway Lumher Company at Portland, Or., has made an assignment. The liabilities are $100,000; assets the same amount. A receiver will contioue the husiness. The failure was caused hy the continued depression of the lumher trade and the financial stringency.

—Senator Perkins, ln response to a telegram addressed to him by Mayor Carlson inquiring as to the mail-carrying contract of the South Pacific Coast, says: "Bell, the Assistant Postmaster-General, assures me that no change is proposed. The same number of calls will be made at San Diego as heretofore."

—Bids for constructing a ditch for the Escondido Irrigation District were opened last Monday. Citizens of the town have been giving individual subscriptions toward purchasing honds of the district, and about $20,000 has already heen secured, with which, it is hoped, some actual work may he accomplished by the district.

—Steps are about to he taken toward the construction of a fish ladder at the falls of the Willamette at Oregon City, Or., for which the last Legislature made an appropriation of $10,000. Governor Pennoyer and Treasurer Metzchan have made an investigation of the premises, in company with United States Fish Commissioner Marshall McDonald.

—After investigation hy the Navy Department of the action of the contractors of the Port Orchard drydock, set on foot hy the Stone Cutters' Union of Tacoma, Secretary Herhert has ordered hard sandstone or granite to he used in the dock instead of Tenino sandstone. This action of the department will cost the contractors about $50,000, it ls said.

—The Louis Landler planing mill burned in this city Tuesday night, entailing a loss of $30,000. It destroyed the engine-room, most of the mill and machinery, a large stock of moldings and casings, a corner of a cottage owned by a widow named Reynolds, and the whole of the three-story frame building numbered 1204-6-8 Grove street, owned by A. Delair.

—Preliminary work on the San Diego jetty is rapidly nearing completion. The machlnery to be nsed at the Sweetwater quarries has arrived and is ln place, and a spur track to the quarries has been laid. Quarrying of rock in great quantities will now begin. On North island an office for Superintendent Smith is completed and work ls progressing with the railway.

—The Tacoma Board of Public Works has discovered a shortage of 5,600,000 gallons of water daily in the water company's guaranteed supply, which was purchased recently hy the city, together with the electric-light plant, for $1,750,000. The board says this shortage will prevent the delivery of 10,000,000 gallons of water daily, to secure which from other sources will cost the city $1,500,000.

—Much work is in view at the Mare Island navy yard, the following ships being booked for repairs: The monitor Monterey, the cruiser Bostnn, the ships Alert, Marion, Ranger, Mohican, Alhatross, Bear, Rush, Lancaster, the lighthouse tender Manzanita, and the reconstruction of the Hartford. This, with the monitor Monadnock now under construction, will increase the force from 700 to 1200 men when the work is fully commenced.

—General Superinteodeot Fillmore of the Southern Pacific Company reports that durlng the month of Angust the shipments of green fruit from this State averaged 55 carloads a day, a quantity sufficient to keep several large cities supplied with table delicacies. In September the average ontput was 47 carloads a day. This is a large increase over last season's shipments. Experts in railroad traffic predict still greater shipments next year.

—The Postoffice Department has accepted the offer of the North American Navigation Company to carry mails for Mexico and Central America. The new arrangemeot is not a contract, but a designation of the company as an official mail-carrier uoder the general laws. Accordiog to the offer the steamers will carry mails once in 20 days to those ports at which they are compelled tn stop by the provisions of the company's contract with the Central American States.

—The comiog Internatiooal Irrlgation Congress, to he held in Los Angeles duriog the week commencing Oct. 10th, is creatiog much interest. The deliberations of the body will comprise a consideration of the following subjects: Irrigation applied to agriculture, applled to horticulture and lts far-reaching ethical and social possibilities and effects. Irrigation legislation—State, national and International. Irrigation engineering, irrigation securities and irrigation machinery and appliances.

—Wells, Fargo & Co., the corporation that for nearly half a century has held control of the express business on this coast, may have a competitor in the field before the beginning of the new year. Within the next 45 days the contract of Wells, Fargo & Co. with the Southern Pacific Company will expire, and half a dozen express companies, including that giant corporation, the Adams Express Company, will, it is said, be allowed to bid for the privileges of the lines controlled by the Southern Pacific Company.

—Under the direction of electrician Pinkham a new suh-marine cable of 500 volts capaclty has heen laid heneath San Diego bay for the purpose of supplying electricity from the power-house for the new electric road soon to be inangurated on Orange avenue, Coronado, in place of the present steam motor. The cable was unwound from a huge spool statiooed on a lighter, and about 3000 feet of the hig strand was required to reach from the ferry-slip on the San Diego side to a point heside the ferry-slip on the Coronado side of the ferry.

—M. D. Smith has heen appointed receiver of the Farmer's Insurance Company, at Spokane, Wash. Assistant State Insurance Commissioner Mott says the books of the company have been kept so as to deceive the stockholders. The assets, he holds at a conservative estimate, do not amount to more than $5000, and the indehtedness greatly exceeds this. The company has out $2,118,000 worth of policies. In the time between the conclusion of the examination and the receiver taking charge, $21,000 worth of securities were abstracted from the company's vaults.

—The sale of the Pacific Cable Railway Company's property under a decree of foreclosure took place at Los Angeles Wednesday. Representatives of the Consolidated Electric Railway Company, holders of the first mortgage, were the only bidders, the property being knocked down to them for $1,344,320.48. The sale means the consolidation of the two systems now in operation and the ultimate electrizatlon of all the principal lines. M. H. Sherman and E. P. Clark of the Consolldated Company did the bidding for their principals.

—The new steel bridge spanning the San Joaquin river near Stockton between the mainland and Roberts' island was formally turned over to the county Saturday hy the builder—the Pacific Bridge Company. The bridge cost $38 000 and was commenced last February. Its total length is 354 feet and the draw is 280 feet. Roberts' island is a very rich wheat and fruit-producing district of 20,000 acres, and the traffic between that section and Stockton is very heavy. Heretofore the farmers have been compelled to pay toll at one of the half-dozen ferries, but all travel will now be hy way of the free bridge.

—Judge Knowles, of the United States Circuit Court at Helena, has appointed S. T. Hauser and E. L. Bonner of Montana and F. L. Stanton of New York receivers for the Northern Pacific branch lines in Montana. The application was made by the Farmers' Loan and Trust Company of New York, who asked for a receiver as agent for the bondholders of the hranch lines. This actlon is in line with the decision of Judge Jenkios in the Wisconsin Central case. Three braoch lines for which receivers were appointed show a deficit of about $1,000,000 for the year endiog June, 1893. There will he no change ln the officers of the roads.

—Among the exhibitors of mineral combustibles, coal, coke, petroleum, etc., who have secured awards at the World's Fair are: Washiogton—State of Washington, collective exhibit of coal and coke; Seattle Coal and Iron Company, Seattle, bituminous coal; Black Diamood Mining Company, Black Diamond, bituminous coal; Newcastle mine, Seattle, bituminous coal; Fairhaven Land Company, Fairhaven, bituminous coal; Green River Coal and Coke Company, Seattle, hituminons coal. Utah—Rio Grande Western Railway, Castle Gate, bituminous coal; Church Coal Company, Coal Hill, bituminous coal; Sodrex-Summit Company, Castle Gate, elatorite; Fort Duchene Gilsonite Company, Fort Duchene, gilsooite.

—Ticket Auditor Holton of the Southern Pacific reports the following number of through passengers from and to all points on the Pacific Coast from Jannary tn July, inclusive, 1893:

	Going East.	Coming West.
Jannary	4,800	7,832
February	5,363	7,618
March	6,920	7,133
April	8,115	8,044
May	12,054	8,034
June	8,951	8,539
July	5,935	8,124
Totals	52,188	56 824

—A petition is helng circulated in San Diego, addressed to Congressman W. W. Bowers, and asking for some relief in the matter of labor employed on the Government jetty. It is claimed in the petition that Contractor S. R. Smith has brought all his laborers from Portland and that he pays them only $1.60 per day and charges them $4.50 per week for hoard. The petitlon asks Bowers to investigate.

Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned

CALIFORNIA.

Amador.

NOTES OF PROGRESS—*Ledger*, Sept. 29: In company with Superintendent J. B. Francis of the Alma we visited that property Thnrsday, and fonnd a force of men at work and enough material on the gronod to make one understand that they had gone to work with a determination to posh forward their work as rapidly as possible. Two shifts are at work upon the shaft, which is now down abont 50 feet. It is of three compartmeots and is well timbered with 12x12 sprnce. The foundation piers of the main buildiog have been laid of stone in cemeot, and the sills for a building 28x90 are in position. This building is to contain the engine, the compressor (if a compressor is necessary), and the gallows frame. The foondation and sills are also down for a boilding 20 feet wide extending the full length of the other on the north side. This boilding is for the furnace and boiler, the store-room, the office and the blacksmith and carpenter shops. They are still ronning with a windlass, bnt soon expect to have their machinery, which has already been porchased in San Francisco, on the gronnd. They have contracted with Lessley for 150,000 feet of lnmber, which is being placed on the gronnd as rapidly as the mill can turn it ont. Two hundred cords of wood are now piled in on the gronnd and more is coming daily. The croppings of the ledge which they are going down 500 feet to strike extends and can be traced on the snrface of the Mattley field for 1100 feet, and io many places shows 40 feet in width. The Alma people have commenced work with a determination to sink 500 feet before prospecting the ledge.

Martin Jones of San Francisco is the prime mover in the incorporation of a company to prospect and develop the Bright mine.

H. C. Calahan and J. C. Price, both mining men, are investigating mining interests along the mother lode. They commenced at the Bay State and expect to reach Angels to-day.

The Wildman is preparing to sink another 100 feet. They are now arranging to place a pnmp to keep the water ont of the oew level, and in coosequence have to shut down their mill for a few days.

Jas. E. Dye, representative of the Jackson Gold Fields of Londoo, has commenced operations in the Amador Qneeo No. 1 tnnnel for the purpose of cleaning the shaft and prospecting the ledge.

Work at the Bay State mine is progressing favorably. They are rnnning for the north ore chnte aod have drafted 245 feet, with good indications of the ledge coming in. Reimbering the sonth drift is also in progress and headway is being rapidly made. The hydraulic pump holds the water easily by seven strokes to a minnte.

Butte.

AT FORBESTOWN.—Oroville *Register*: In company with T. H. Dodson of Strawberry valley

and L. E. Norton of this town, on Sunday last we visited tbs Gold Bank or Stow mine at Forhestown and were corteously shown through the works hy Mr. E. Herrin, who has long been connected with the reduction works.

While not attempting to give any detailed description of the mine or works, some points we gathered may be of interest. The lode is situated on the side of a steep canyon and it is qnite difficult to get machinery and supplies down to the mill and reduction works. A shaft hae been sunk to a denth of 380 feet and the main tunnel is now 300 feet, while the ledge itself ie from sixteen to twenty feet wide. During the day from 120 to 140 carloads, each weighing ahout 1800 pounds, are taken from the mine. The rock is crushed in a powerful rock-hreaker run hy water power. It is then fed to the forty stamps, each weighing half a ton, which grind it into a powder so fine that it passes through very fine iron screens in front of the batteries.

We found some eighty-five men at work in the mine and mill, blackemith shop, chlorination works, etc., hut everything is arranged to work the ore on the most economical scale and with as little manual lahor as possible. The mill and other huildings are of the moet substantial character and all the works have been put up to stay. The property ie owned by the Hon. W. W. Stow, and his son, H. P. Stow, is superintendent and general manager.

The Golden Queen mine, under the supervision of C. J. Nickerson, is near the Gold Bank and contains ten stamps. Geo. Hunter is the experienced foreman. We did not have time to visit the mill, as we had an engagement at nine o'clock to go over to the Shakespeare mine, and so climbed up the eteep hill to Forhestown, where we joined the party consisting of twelve visitors from Oroville.

Walking over the hill to the Shakespeare, we were met hy G. W. Price, the general manager of the mine, and shown through the different works. The mill is a substantial thirty-stamp etructure, and, like the Gold Bank, ie run by water power. The rock is similar in character to that found in the Gold Bank and undergoes similar treatment. The property is owned by Alvinza Hayward, and Mr. Montgomery is superintendent, while G. W. Price is assistant superintendent and general manager.

In each of these mines large sume were spent before a mill was erected, and it was only after the ledges were fully developed that the mills were built. Mr. Price has been the active man in charge of the Shakespeare mine and mill; he planned and superintended the building of the various works and has had the active supervision of the running of the property, yet he is quite young, being only twenty-four years of age.

H. P. Stow is also a young man, perhaps twenty-five or six, but to him the whole success of the Gold Bank is due. He took hold of the property when much gold was being lost, and visited nearly all of the important mines in the State, making a careful study of the methods of working the ore. He had studied mining very carefully in Europe prior to this time and he now set about making some changee which produced an excellent result, for he made the mine a very profitable one. To these young gentlemen Forhestown owes much of her present prosperity.

Other mines are heing developed and it is prohable that other mills will soon be erected.

Calaveras.

ANOTHER ENTEEPRIEE.—*Chronicle:* A company of San Francisco capitalists have about concluded negotiations for 200 acres of land in Poor Man's Gulch, owned by Gobi & Del Orto of this place, for the purpose of opening up and developing the quartz ledges known to exist on the tract.

El Dorado.

MINE BOUGHT.—*Democrat*: The Schneider mine, on Mathinas creek, has been purchased by a company of Sacramento capitaliete, and active operations to develop it are already under way.

Inyo.

REPOETEN SOLD.—*Index:* Report eays that Frank Sorba has sold his silver-lead mine at Darwin to Los Angeles capitaliets for $10,000, and that the money has been paid.

Lake.

QUICKSILVEE ENTEEPRISE.—Sacramento *Bee:* J. T. Thatcher, L. G. Emerson, J. Desmond and J. L. C. Smith of this city are largely interested in the Oalistoga Consolidated Copper and Quicksilver Mine, nine miles north from Calistoga, in the southern part of Lake county. The vein ie from three to nine inches in thicknese, and every few feet a bed of rich ore is discovered. The mine-ownere have tunneled into the hillside 200 feet. The vein is about 60 feet helow the surface. The ore contains $300 in silver, $40 to $75 in copper and traces of gold to the ton. Adjoining the claim are deposits of quicksilver. Ten olaims have been located. The company proposes shortly to erect smelters to reduce the ore. Twenty-seven years ago the country in the vicinity of the mine was reputed to be rich in ore. Some mining was then carried on, but no efforts were made to systematically work the mine until recently.

Monterey.

WARTHEN COAL MINE.—Geo. Reasons of Parkfield was interviewed last week by a reporter of the San Miguel *Courier* regarding the progress of coal mining at Warthen canyon. near Priest valley, Monterey county. The *Courier* says: "Messrs. Hart and Grabhel, local capitaliste, have sent one carload of the coal to Alcalde, which was tested hy the railroad and pronounced to be of excellent quality. These mines promise to be a big thing for this part of the country, for a number of men are already at work and a two years contract hae been entered into with Mr. Reasons to do the hauling, who, while in town, purchased a large amonnt of supplies, including a Bain wagon. The greatest drawback to the speedy opening up of these coal fields is their inaccessibility, situated as they are in a very wild and rugged country twenty-five miles north of Parkfield and ninetesn from Alcalde, Fresno county, the nearest railroad point. The present road is in such a bad condition and so indirect that Mr. Reasons has decided to commence at once to build another one. There is now plenty of coal to be hauled and that valley may soon see lively times."

Nevada.

GETTINO THEIR DAM READY.—*Union:* The Excelsior Mining Company of Smartsville ie hard at work erecting a dam which will safely hold mining debris from their mine when hydraulicking is resumed. As soon ae the dam is completed the company will apply to the Dehris Commissioners for a permit to resume mining.

THE WEST DELHI.—*Transcript*, Sept. 28: James English, one of the owners of the Pioneer Reduction Works, has just returned from a business trip to Columbia Hill. He says that a very rich strike has lately heen made in the West Delhi mine in that district. The ledge is large and the rock high grade, being the same general character of quartz that is found in the old Delhi.

WILL MAKE A MINE. — *Herald:* Richard Thomas, over from Birchville, reports the mining claim recently located by his son R. I. Thomas, J. J. Ott and L. P. Schmidt to be a bigger prospect than any one thought. The gentlemen have now located other claims jnst south of the one on Sweetland creek, which are richer than the other. He thinks they have a bonanza, and the wonder is that it was allowed to lie idle all these years.

THE DAISY HILL.—*Union*: For a number of months past, Ohas. H. Taylor, son of M. C. Taylor of this city, hae heen in San Francisco for the purpose of organizing a company to work the Dsisy Hill mine, a very promising proepect. The company has heen formed, and the capital stock is $500,000, half subscribed. C. A. Roberts holds most of the etock, and his associate directors are Alfred H. Walker, C. H. Kingsley, Charles H. Taylor and A. Evelyn Ball.

BEIGHT OUTLOOK.—*Transcript*: A gentleman who came over from San Juan on Wednesday says that within the next six weeks at least four or five Huntington mills will reach there for as many new quartz ledges which will be etarted up on the Ridge. Two of them are to be put up near San Juan. One will be erected on Sweetland creek and two more in that neighborhood. He says the mine which was recently located hy Richard Thomas, Richard I. Thomas, J. J. Ott and L. P. Schmidt will unquestionahly prove to be a genuine bonanza to these gentlemen.

The same informant predicts that within a year there will be as many men employed in working quartz ledges on the Ridge as there were in the hydraulic mines during the palmiest days of that industry.

THE SOUTH DAKOTA.—*Tidings*: Recent developments at the South Dakota mine are of a very encouraging nature. The ledge has improved in appearance very much. The shaft hae attained a depth of 128 feet and the ledge is fully two feet in size, the rock showing free gold in good quantities. Apart from the size and nature of the ledge, the owners have reason to be proud of the fact that only surface water was encountered, and it is now certain that the Idaho mine drains the entire length of the South Idaho location (3000 feet). Seventeen years ago, in the 700-foot level of the Idaho mine, going east, a large stream of water was struck at the same time several eprings near the residence of Joseph O'Keefe were drained. It has developed that the South Idaho ledge was also drained at that time. Ae above stated, the only water found in the South Idaho ie snrface water and at this writing amounts to but 500 gallons in 24 hours. The company will be able to eink fully 700 feet without having water to handle. This, of course, means a saving of thousands of dollars which would otherwise be expended in pumping, etc. The mine is in the same mineral helt as the Idaho-Maryland and but 1500 feet south of ite illustrious neighbor, and bide fair to rival it as a produncer. Nine men are steadily employed, and sinking is going on all the time. Considerable quartz is extracted every week, and if the company had a mill on the ground, enough could be extracted to more than pay all expenses. No assessments have ever been levied by the company, fnnds being raised by selling company stock.

Plumas.

ON NORTH FORK.—*National-Bulletin*, Sept. 28: The mining outlook in the northern part of the county is improving. The Big Flat country is attracting attention. It is understood that the Fred Scott claim at the lower end of the Flat is paying well. There is talk of capitalists taking hold of properties on the Flat. Should they do so, there is hut little doubt that one of the best drift mines in the State would he opened up. Several mining men from Nevada have quietly drifted into the northern part of the county making inquiries about quartz properties.

IN GENNESEE VALLEY.—Plumas *National-Bulletin*: Joseph Gruss is pushing work at the Genesee mine. He has 12 men employed, ie running the mill steadily, and the impression exists that considerable money is being extracted. This mine has yielded, in the past 30 years, a large amount of money, and yet it has been worked in a small way only—in fact it has scarcely been prospected. Several improvements have been made on the premises.

Some men are working at the Brandt mine, putting things in shape for active work on the property, which was recently purchased by capitalists from the State of Nevada. It is expected that next month concsntrators will be sent in from Reno and placed in the mill.

Last week, A. Dragovich returned from San Francisco, bringing with him some mining men to look at the Lucky S mine. Ore from this property is reported to prospect vsry well. Senator Westlake of Virginia City, took 40 pounds of ore from one of the tunnels, milled it by a new process, and secured returns at the rate of $37 per ton.

GRANITE BASIN ITEMS.—Cor. *National-Bulletin*, Sept. 27: Blsisdell & Co. are erecting a fine house on the property of W. C. Graves, whose mine they recently honded. They have several men at work in the mine.

Landregan & Co. have resumed work again on the old Minto mine and are making extensive alterations and improvements on the property. Two six-horse teams passed through the Basin loaded for them this week, and another team is due now. They will commence running the mill at once and intend to put on a large force of men.

H. Waldron has two men at work and is rnnning his mill.

Peterson and Toland are rnnning their mill steadily on first-class ore, and are doing well. They are at work on the Schneider mine.

Messrs. See & Jolly have several men at work on the Specimen mine, and the ore which they are taking out is said to consist of nearly as much gold as quartz.

San Bernardino.

ON THE COLOEADO.—San Bernardino dispatch, Sept. 30: The Pichacho Gold Mines Company will etart work to-morrow with 125 men. These placer mines are located about 25 miles above Yuma, on the California side, and will be operated by pumping water for sluicing purposes out of the Colorado river with three Worthington pumps, 20 tons each, throwing 300 miner's inches of water 500 feet high and 26,000 feet distant from the river through an 11-inch steel screwed-joint pipe. For this purpose a 500-horse power engine is used. The test of the pump and plant made a few days ago proved satisfactory.

Sierra.

RICH STRIKE.—Sierra Valley *Leader*: A rich strike has been made in the Butte Saddle mine, near Sierra City. A tunnel was run until they were at a depth of 350 feet from the surface. They have now commenced sinking at the end of the tunnel and the ledge has grown much larger and is better defined. The rock is estimated to be worth in the neighborhood of $100 per ton, and it is thought that some of the rock will pay as high as $300 a ton. A. Sitze, the butcher at Sierra City, is the principal owner.

FOREST CITY NOTES.—Oor. *Messenger*, Sept. 28: The company who took a five-year lease on the lower end of the South Fork are progressing finely 800 feet from the mouth of the main tunnel. They have started a new drift which will put them into good paying gravel at ahout 250 feet and give them drainage for the future.

The Mt. Moriah is looming up and if the weather keeps fair will have their 20-etamp mill running hefore snow flies. This will be a grand addition to Sierra county.

Robert McMnrray, Hon. A. B. Dibble and others have taken in hand the Idaho quartz mine, on the Alleghany side and near the Oriental mine, and are now running a main tnnnel which will cut the ledge at about 150 to 200 feet. The prospecte that have been taken on thie ledge heretofore are promising, bnt it was in the hands of poor men who were unable to develop the property.

Trinity.

GOON BONY OF ORE.—*Journal*: The Enterprise Mining Company of East Fork have a fine body of ore in the Lone Jack mine, an extension of the Enterprise, and are running their five-stamp mill night and day. Mr. Chas. Lobdell, one of the owners, informe us that the mine is looking very well. Two men can take out sufficient ore to keep the mill running, and with the facilities for handling rock, it can be crushed very cheaply.

THE MAPLE.—*Journal*: J. M. Tompkins was in from Junction City this week and says that the prospects of the Maple mine on Canon creek are very favorable. The ledge has been struck in the lower tunnel and carries some very rich rock. The ledge in the upper tunnel is three feet wide and of a good character of ore. Cutting the ledge in the lower tunnel gives 120 feet of stoping ground. The company have an arrastre on the property with a capacity of crushing five or six tons a day.

Tuolumne.

FINE OEE.—*Democrat*: The Jo Hooker mine is located in the vicinity of Soulshyville, and it holds out encouraging prospects to its enterprising owners. The ore will yield $25 per ton in free gold, and the vein being large it gives every assurance that the mine will soon take rank with some of our hest mineral properties.

NEVADA.

Washoe District.

LAST WEEK AT THE COMSTOCK.—In the Ophir and Mexican mines all work on the 1565 level has been discontinued and implements and machinery removed therefrom, and prospecting is to he resumed on the 1465 level of hoth mines. On the 900-foot level of the Union shaft the north drift from the main west drift is 176 feet in Sierra Nevada ground, and the face is in quartz giving low assaye. The south lateral drift from the Sierra Nevada tnnnel on Cedar hill is in 98 feet and the face is in porphyry and quartz. In the Andes mine some quartz of low assay value is being cut in a northeast drift on the 420 level.

There has heen no change in the condition of the Best & Belcher and Gould & Curry mines. Few miners are at work in them. In the Savage mine, on the 1100 levsl, they continue to extract ore of fair grade at several points above the floor of this level up to the nineteenth floor. They are doing considerable prospecting work between this and the 950 level. During the week they hoisted 258 cars of ore from this level. Shipped to the Nevada mill 120 tons. On account of the mill being crippled no ore was crushed since last weekly report. The samples average $27.35. They shipped to the United States Mint, Carson, September 21, 294 pounds of crude hullion.

In the Hale & Norcross mine the east crosscut 1300 level from the bottom of the winze was extended 24 feet, total length 31 feet; face in streaks of ore of low assay value. Sinking the winze in the ore will be resnmed this week.

In the Chollar mine they started a drift on the 100 level at a point 145 feet north of south line, which is now out 65 feet; face is in porphyry and bunchee of quartz which give fair assays; are yet engaged in making repairs to the main incline below the 900 level.

In the Potosi mine the upraise from the south drift on the sixteenth floor above the 930 level has advanced 38 feet on the slope; top in porphyry and low-grade quartz. The north drift 28 feet below the 1000 level is out 66 feet; face shows four feet of fair-grade ore; are sinking a winze below the south stope 1000 level, which is now down ten feet in ore of good quality; extracted and sent to the mill the past week 188 tons and 250 pounds of ore from the 1000 and 1100 levels; milled during the week 215 tons; on hand at mill 120 tons and 1450 pounds; average battery assays, $23.58; average car-sample assays, $24.63; shipped to the United States Mint at Carson 380½ pounds of crude hullion. At the Ward shaft the west drift from the station at the 820 level is out 188 feet and the face is in hard porphyry.

There is an improvement in the Yellow Jacket mine. The upraises above the 1100 level are cutting ore, some of which assays high.

ARIZONA.

MINING NEWS.—Prescott *Journal-Miner*, Sept. 27: H. M. Palmer has bonded the Dividend mines from Johnorew & Butler.

Marsh's mill at Minnehaha is running 12 hours per day. There is an abundance of ore to run day and night, but water is scarce.

F. L. Wright has purchased one-third interest in the Legal Tender mine in Big Bug district.

A. C. Gilmore and Charles Bradbury have eight tons of ore ready for shipment from the Zero mine. The ore is silver and goes 675 ounces per ton.

Another rich strike is reported in Chaparral district, a district already prominent on account of the numerous strikes made there. The lucky owners of the new find are John Merwin and B. H. Smith. The vein is said to be 14 inches wide and assays $212 per ton in gold. The owners will push development work on their claim.

The Yarnell mill is running steadily, doing satisfactory work. Considerable improvements are being made around the mine and mill.

John S. Jones' mill, at Big Bng, has been running now for several months.

The five-stamp mill owned by Dr. J. Miller was started up yesterday on ore from the Westlake mine and worked very satisfactorily, considering that everything is new. The machinery has been placed in position under the superintendency of Mr. Mahoney, formerly engineer of the Prescott Water Works, and is being rnn hy him. This property is situated only four or five miles from town. It is a gold property and is opened up by a tnnnel running in on the vein a distance of between 300 and 400 feet. The ore assays well, and the doctor now bids fair to eecure returns from his three or four years' development work of the property.

J. D. Hslm, who returned yesterday from a visit to the Austin & Owene' gronp of mines, says that, as far as developed, the property shows up very hig. The ledge is immense, being 20 feet or more across it, while the ore assays well. Of course the owners have not had time to make much of a showing yet in the development of this monster ledge, and it is impossihle to determine exactly what the ore will mill. He thinks that $10 per ton would he a conservative estimate, although present indications are that it will go $40 per ton.

OREGON.

MAKINO WAGEE.—Rogue River *Courier*: Two men are drifting on a bar just helow the mouth of Galice creek on Rogue river and cleaning up from $6 to $10 per day. They have strnck a pay channel and are digging a tunnel four feet bigh and 12 wide, working on their knees with pick and shovel and wheeling the dirt to slnice boxes placed eome distance below.

PLACEE MINE.—Rogue River *Courier*: The Illinois Hydraulic Mining Co.'s placer on Bollen creek, near the California line hids fair to rival the famous Wimer and Simmons placere in richness and extent. The company has 160 acres of very rich dirt, which they have been prospecting for several monthe with a "self-shooter" and as a result, six ounces of gold wae picked up off a strip of bedrock 36 feet long and six feet wide last week. The bank which is composed of porphyry and serpentine, averages 50 feet in depth, and the bedrock is a light-colored scaly granite. A magnificent fall of water has heen obtained by digging a ditch three miles long, and a natural lake at the summit of the mountain near hy will act as a reservoir from which water can be obtained all summer. A string of pipe and a monitor are now heing placed in position and as these fields furnished many hig nuggets in early days, we expect to hear of hig clean-ups on this new property. Supt. Doney says there is plenty of good mining ground near Browntown awaiting energy to develop, and he is willing to guide the

stranger to rich fields still nndeveloped. The elevation of this placer is 3500 feet, so there will be nn tronble ahont dnmping the debris. Six men are now employed at the mine, bnt the force will have to be increased as developments proceed. Snpplies for the mine are obtained from Browntown, distant six miles.

JACKSON COUNTY NOTES.—*Times*, Sept. 30: Messrs. Hill and Stevens, who have been prospecting an extension of the Homestake mine in Evans' Creek precinct, have struck a ledge over two feet wide, which prospects well.

The Jacksonville Milling and Mining Co. met a few days since and ordered the stock upon which assessment had not been paid sold. Prospecting will be resumed at an early day. A well-defined ledge is in sight, but whether it is rich remains to be seen.

E. Sanderson Smith, the well-known mining expert, who has done so much to attract the attention ot capitalists toward southern Oregon, will resnme operations at the Gold Hill mine in a short time. He is hopefnl of striking a rich seam of ore which will etartle the oldest inhabitant.

The Monntain Lion mine, in Miesonri Flat district, has not been honded to any one. Bailey & Co. are working it aud taking ont free-miltting ore to be crushed on their two stamp arrastres. As they have already considerahle high-grade ore on the various dumps, and tons more in sight, an extensive and sncceesfnl run will be made. Mining men who are looking for first-class gold mines should not fail to visit the Monntain Lion and convince themeelves that it is one of the best-paying qnartz properties in the State.

"The Annie mine was never in better conditon than it is to-day," said J. B. McGee, president of the Aunie Mining Company, to a reporter one day this week. "By sending onr concentrates to Tacoma for reductiou," he continued, "we have just doubled our product in pure gold, and the total monthly average outpnt at the present time ie about $6000. We have recently pnt in two emall concentrators, capable of turning out a ton of concentrates per day. The first ton of this material wae shipped to Tacoma on July 15th and uetted ns abont $100. Since that time we have been shipping regularly, aud uow the average retnrn is about $100 per ton. This, taken together with another $100 worth of metal crushed ont by a five-stamp mill, makes np the neat little snm I have spoken of."

NEW MEXICO.

THE TUERTO PLACER FIELDE.—Some attentiou ie heing paid jnst now in Eastern financial circles to the Tuerto placers, or gravel deposit, lying in the extreme eouthern portion of Santa Fe conuty, New Mexico. It ie claimed in circnlars of the Irrigation and Hydraulic Mining Company that the deposit has a snperficial area of 11,684 acres (owned by the company), and has an average depth of 36 feet, or 678,600,720 cubic yards, which it is assumed will prodnce at least $1 per cnbic yard. The possibility thus stated would be a sum greater than the gold placers have yielded in California. The company, however, assnme that thie $1 per cubic yard will be a moderate yield for the eutire 678,600,720 cubic yards they own. The recorded rainfall is but 11 inches per annnm. The only dependence for either present hydraulic mining or future irrigation lies in the possibility of obtaining a eupply of water from the earth itself. There are now four wells giving water in considerable volnme. No particulars as to qnantity are at hand with regard to the laet strike. The first well is dowu 585 feet, and the water rises 450 feet in the hore. This is not nsed for hydranlic work as yet. A flow of 186 gallons per minnte, or 11,160 per hour, and 267,840 gallons per day of 24 houre, has been steadily maintained. Under a five-inch pressure (this ie the new Mexican miner's inch) thie body of water will prodnce a etream of nearly 17 miner's inches. An ingenious and valnable hydranlic washer, on the centrifngal principal, invented hy M. Bazin, a French hydraulic and mechanical engineer of repute, which has had au extended use in Sonth Africa, on similar gravel placere, has been purchased and put in operation at the Tuerto placers. So well satisfied are the managers that the nnmher of the machines will soon he increased to six, ordere having already heen placed. It is claimed as able to wash one cnhic yard of gravel with one cubic yard of water.

BACK FILES nf the MINING AND SCIENTIFIC PRESS (unbonnd) can be had for $8 per vulume of six months. Per ysar (two voiumes) $5. Inserted in Dewey's patent binder, 50 cents additional per volume.

Market Reports.

The Markets.

SAN FRANCISCO, Oct. 5, 1893.

The silver market has maintained its general evenness during the week. The silver debate is still going on in Congress, and much confidence is expressed that the repeal hill cannot be passed without a compromise. Indeed, it seems to be certain that the single-standard men must make concessions. The meeting of the Pan-Bimetallic League at St. Louis has been an event of the week.

Fine Silver in September.

Bar silver sold in London on the 1st of September at 34d and in New York at 73¼c. The market throughout the month was irregular. On the 11th, the rates were 34½d in London and 74⅞c in New York. These were the highest figures for the month. The extremes in both for the first nine months of the year were as follows:

	London High.	London Low.	New York High.	New York Low.
January	38 9-16d	38 2-16d	84c	82½c
February	38 8-16	38 2-16	84¼	83¾
March	38 6-16	37 9-16	83⅝	81⅞
April	38 5-16	37 14-16	83⅜	82½
May	38 9-16	37 8-16	84⅛	82¼
June	38 12-16	30	83¼	62
July	34 12-16	32 2-16	75	69
August	34 12-16	32 11-16	75½	70¼
September	34 8-16	33 14-16	74⅞	73

In September, 1892, the extremes in London were 38 5-16d to 38 2-16d, and for the first nine months of that year 43 12-16 to 37⅝d.

Coinage of the San Francisco Mint.

The September coinage of the San Francisco Mint compares as follows:

	1892.	1893.
Double eagles	$2,160,000	$1,780,000
Eagles	.....	220,000
Standard dollars	100,000	.....
Half dollars	.....	200,000
Quarter dollars	.....	20,000
Totals	$2,260,000	$2,220,000

Silver and the Metals.

NEW YORK, Oct. 5.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.	Copper.	Lead.	Tin.
Thursday	34⅛	74	9 70	3 65	21 00
Friday	33⅛	74	9 70	3 65	21 00
Saturday	34⅛	74	9 70	3 65	21 00
Monday	34⅛	73⅞	9 70	3 65	21 00
Tuesday	33⅞	73¾	9 70	3 65	21 00
Wednesday	33⅞	73½	9 70	3 65	20 90

San Francisco Metal and Coal Market.

ANTIMONY.		**QUICKSILVER.**	
Per lb	— @ 13	Home trade, pr. flask	40 50 @41 00
BORAX.		**STEEL.**	
Refined, in car lots	— @ 7½	English, lb	— @ 18
Powdered, do	— @ 7½	Oanton tool	— @ 8½
Concentrat'd, do	— @ 6½	All grades jobbing at advance.	
All grades jobbing at advance.		Sft Diam'd tool	8½@ 15
COPPER.		Pick & Hammer	6½@ 10
Solt	23 @ —	Machinery	4 @ 5
Sheathing	23 @ —	Toe Calk	— @ 4½
Ingot, jobbing	— @ 20	**PIG TIN.**	
Do, wholesale	15 @ 16	Spot ₱ lb	21½@ 22
IRON.		**COAL.**	
Sar, base	— @ 2½	SPOT FROM YARD—PER TON.	
Norway, base	— @ 4½	Wellington	8 00
PIG IRON.	Spot.	Greta	7 50
		Nanaimo	6 50
Eglinton ₱ ton	—@—	Cilman	6 00
Glengarnock	27 00@—	Seattle	8 50
Am. Soft, No. 1	25 00@—	Coos Bay	5 50
Shotts No 1	27 00@—	Cannel	9 00
Puget Sound	—@—	Egg, hard	12 00
Clay Lane White	30 00@—	Wallsend	7 25
Langloan	27 00@—	Scotch Splint	8 00
Gartsherrie	27 00@—	Brymhn	7 50
Sarrow	—@—	West Hartley	7 50
Cargofleet	—@—	**TO LOAD—PER TON.**	
LEAD.		Australian	6 50@—
Pig	— @ 4½	Liverpool Steam	6 87@—
Bar	— @ 5	Scotch Splint	7 00@—
Sheet	— @ 6	Cardiff	7 00@—
Pipe	— @ 5½	Lehigh Lump	10 00@—
SHOT.		Cumberland	8 50@—
Drop, sizes *smaller* than B, ₱ nag of 25 lbs	3 75	Egg, hard	9 00@—
Do do, B and *larger* sizes ₱ nag of 25 lbs	2 00	West Hartley	7 50@—
Buck, Balls and Chilled do, ₱ hag of 25 lbs	2 00	**COKE.**	
		English, to load	$9 50@10 00
		Dn, spot, in hulk	—@12 00
		Oo, in sacks	—@14 00
		Cumberland	9 50@—

The Stock Market.

SAN FRANCISCO, Oct. 5, 1893.

Dullness unprecedented is the condition of things on the stock market. The miners on the Comstock who decline to reduce wages are in part held responsible for the stagnation, the claim being advanced by operators that active work would be resumed if the wage question were settled. Meanwhile, transactions are insignificant.

The monthly financial statements of the mining companies have been filed. The following companies report having had cash on hand September 30, 1893, with the expenses for that month unpaid: Andes, $8353.41; Alpha Consolidated, $4424.79; Belcher, $2521.60; Bullion, $13,106.22; Bodie Consolidated, $8750.65; Best & Belcher, $6115.23; Consolidated California & Virginia, $56,985.54 in cash here and in Virginia City and unsold bullion valued at $14,443.15; Consolidated Imperial, $1463.33; Challenge Consolidated, $339.75; Caledonia, $8401.02; Consolidated New York, $333.38; Chollar, $2921.58; Crown Point, $2610.79; Confidence, $1560.51; Exchequer, $679.33; Gould & Curry, $3903.96; Hale & Norcross, $11,203.16; Julia Consolidated, $426.35; Justice, $1609 83; Mexican, $18,101.82; Mono, $4713.56; Nevada Queen, $562.25; Ophir, $17,011.99; Savage, $7646.49; Segregated Belcher, $40.96; Sierra Nevada, $19.197.67; Silver Hill, $85.02; Syndicate, $1339.71.

The following mining companies report having had an indebtedness September 30, 1893, with the expenses for that month unpaid: Alta, $11,123.90; Butwer Consolidated, $3116.31; Commonwealth, $25,361.43; Grand Prize, $524.87; Lady Washington; $1842.88; Occidental Consolidated, $7000 due on company's bank, less $237.18 cash on hand; Overman, bills payahle of $5990, less $547 cash on hand, and a balance of $5118.70 to he collected in the pending assessment; Potosi, $20,046.72; Utah Consolidated, $1119.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY AND LOCATION.	No.	AMT.	LEVIED.	DELINQ'T AND SALE.	SECRETARY.
Amador C Mine, Cal	1	5c	Sept 7,	Oct 12, Nov 7	F E Luty, 330 Pine
Arnold G and S M Co, Ariz	5	50c	Sept 19,	Oct 23, Nov 9	A Judson, 320 Sansome
Bay State M & Dev Co, California	16	2c	Aug 26,	Sept 28, Oct 25	A J Coster, Plymouth, Cal
Bello Isis M Co, Nev	19	10c	Sept 25,	Nov 2, 24	J W Pew, 310 Pine
Bodis Cons M Co, Cal	16	15c	July 24,	Sept 25, Oct 24	M E Willis, 309 Montgomery
Bodie Tunnel & M Co, Cal	17	10c	Sept 5,	Oct 7, Oct 24	Chas C Harvey, 309 Montgomery
Brunswick Cons G M Co, California	6	2c	Sept 4,	Oct 6, Oct 24	J Stadtfeld, 56 Nevada Block
Caledonia G M Co, South Dakota	17	50c	Sept 13,	Oct 16, Nov 15	F G Drum, Mills Building
Cons New York M Co, Nevada	11	5c	Sept 27,	Nov 1, Nov 22	Chas E Elliott, Nevada Block
Con Wyoming G M Co, Nev	3	5c	Oct 3,	Nov 13, Dec 2	W J Gurnett, 308 Pine
Crown Point G & S M Co, Nevada	82	10c	Sept 26,	Oct 31, Nov 21	James Newland, Mills Building
Dora Gold Mining Co, Cal	1	5c	Aug 25,	Sept 25, Oct 25	Chas J Blumentual, 415 Montgom'y
Jackrabbit M Co, Cal	4	5c	Aug 10,	Sept 15, Oct 6	Thos Wetzel, 320 Sansome
Martin White M Co, Nevada	23	25c	Aug 31,	Oct 26, Dec 14	K L Ross, 120 Sutter
Orleans M Co, Cal	13	2c	Aug 22,	Oct 3, Oct 31	Geo P Thurston, 575 Mission
Overman S M Co, Nevada	68	5c	Sept 1,	Oct 5, Oct 26	Geo D Edwards, 414 California
Potosi M Co, Nev	39	25c	Sept 11,	Oct 18, Nov 7	Obas E Elliott, 309 Montgomery
Siskiyou Cons Quicksilver M Co, Cal	7	1c	Aug 29,	Oct 5, Oct 27	Edw F Stone, 306 Pine
Telrakoff S M & M Co, California	10	1c	Aug 18,	Sept 28, Oct 19	W J Gurnett, 308 Pine
Union Con S M Co, Nev	48	20c	Oct 3,	Nov 8, Nov 29	Chas E Harvey, 309 Montgomery
Utah Cons M Co, Nevada	19	5c	Sept 1,	Oct 4, Oct 25	A W Havens, 309 Montgomery
Valenzuela Cons M & L Co	2	1c	Sept 20,	Oct 23, Nov 10	A Everett Hall, 431 California
Yellow Jacket M Co, Nev	55	25c	July 29,	Sept 5, Oct 9	W H Blanvelt, Mills Bldg

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE
Con Cal & Va M Co, Nev	Annual	A W Havens, Nevada Block	Oct 16
Hale & Norcross S M Co, Nev	Special	A B Thompson, Nevada Block	Oct 12
Mayflower Gravel M Co	Annual	D M Kent, 330 Pine	Oct 16
Pine Hill G & S M Co	Annual	Chas A Hare	Oct 10

Cal. Debris Commission Notices.

NOTICE.—The California Debris Commission, duly appointed under the Act of Congress of March 1, 1893, having received a petition from Louis Conrath, attorney in fact for the Excelsior Water and Mining Company, for permission to mine by the hydraulic process in the Blue Gravel Placer mine, near Smartaville, Nevada County, California, and to deposit tailings in an old hydraulic pit, hereby gives notice to all concerned that a hearing will be held at the office of the Commission, room 92, Flood Building, San Francisco, on October 17, 1893, at 1:30 o'clock P. M. On and before this hour and date all parties interested may file affidavits, plans, and maps, in support of their respective claims. By order of the Commission: W. H. Heuer, Major, Corps of Engineers, U. S. A., Secretary.

NOTICE.—The California Debris Commission, duly appointed under the act of Congress of March 1, 1893, having received a petition from B. Below and others for permission to mine by the hydraulic process in the Polaris, Etna and Austral mines, situated in Goodwin Township, in Plumas county, California, and to deposit tailings behind a dam to be built in Hopkins' creek, gives notice to all concerned that a hearing will be held at the office of the Commission, Room 92 Flood Building, San Francisco, on October 10, 1893, at 1:30 P. M. On and before this hour and date, all parties interested may file affidavits, plans and maps in support of their respective claims. By order of the Commission. W. H. Heuer, Major, Corps of Engineers, Secretary.

NOTICE.—The California Debris Commission, duly appointed under the Act of Congress of March 1, 1893, having received a petition from A. Steinberger for permission to mine by the hydraulic process in the Brandy City District, situate at Brandy City, Sierra County, California, and to deposit tailings in an old hydraulic pit, gives notice to all concerned that a hearing will be held at the office of the Commission, room 92, Flood Building, San Francisco, on October 10, 1893, at 1:30 o'clock P. M. On and before this hour and date, all parties interested may file affidavits, plans and maps in support of their respective claims.—By order of the Commission: W. H. Heuer, Major, Corps of Engineers, U. S. A., Secretary.

NOTICE.—The California Debris Commission, duly appointed under the Act of Congress of March 1, 1893, having received a petition from H. Buckley and Louis L. Hillman for permission to mine by the hydraulic process in the Illinois Gold Gravel Mine, at Secret Diggings, near the Forte, Plumas county, California, and to deposit tailings in an old hydraulic pit, hereby gives notice to all concerned that a hearing will be held at the office of the Commission, Room 92, Flood Building, San Francisco, on October 24, 1893, at 1:30 o'clock P. M. On and before this hour and date all parties interested may file affidavits, plans and maps in support of their respective claims. By order of the Commission: W. H. Heuer, Major, Corps of Engineers, U. S. A., Secretary of the Commission.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, October 5, 1893.

9:30 A. M. SESSION.

5 Confidence	35c	150 Occidental	10c

2:30 P. M. SESSION.

200 B & B	40c	100	10c
200 Ophonia	5c	150 Potosi	20c
300 Con. Cal. & Va	1.35	400 Mexican	55c
200	1.20	100	60c
100 Challenge	5c	200 Ophir	75c
250 Crown Point	15c	400	70c

Pacific Stock Exchange.

9 AND 10:15 A. M. SESSIONS.

100 Belcher	26c	200 Crocker	8c
200 Con. Cal. & Va	1.25	150 Peer	10c
200	1.30	100 Potosi	32c
650 Crown Point	12c		

2 P. M. SESSION.

500 Alta	10c	100 Kentuck	5c
200 O. O. & Va	1.22½	300 Ophir	73c
100 G & O	18c	100 Potosi	21c
100 H & N	37c	100 Savage	25c

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Ptoneer Patent Sottcitors for Pacific Coast.

FOR WEEK ENDING SEPT. 19, 1893.

505,418—REFINING ASPHALTUM—A. F. L. Bsli, S F.
505,038—LAWN SPRINKLER—S. S. Black, Pasadena, Cal.
505,395—UTILIZING WASTE PRODCTS OF PETROLEUM—J. P. Engle, S. F.
505,099—BAOSN BORNER—H. S. Caylord, Armona, Cal.
505,219—CLOTCH—J. C. Gibson, S. F.
505,402—PROPELLER—Hall & Sloan, S. F.
505,107—BEARING—C. B. Jacobs, Fremont, Wash.
505,464—PERFORATOR—P. L. Kosclalowski, S. F.
505,208—FRUIT STONER—P. Maisonneuve, S. F.
505,412—CONCENTRATOR—T. McGlew, S. F.
505,164—CONCENTRATOR—T. McGlew, S. F.
505,410—HARNESS—Thos. Murphy, S. F.
505,176—MAST FOR DRDDERS—W. B. Pless, Stockton, Cal.
505,133—BOST FORM—N. Scbell, S. F.
505,331—SCREEN HOLDER—J. Scouler, S. F.
505,414—BALLOON—C. A. Smith, S. F.
505,134—RAIL HEATER—Smith & Knowlse, Spokans, Wasb.
505,257—CLOTCH—I. F. Tbompson, S. F.
505,330—MOTOR—J. E. Wsst, Centralia, Wasb.

FOR THE WEEK ENDING SEPT. 28, 1893.

505,548.—CARPET STRETCHER—C. W. Anslsy, Medical Lake, Wash.
505,684—NUT LOCK—J. M. D. Bland, La Crande, Or.
505,697—FURNAOE—C. M. Bridges, Seattle, Wasb.
505,599.—POMP—Fultnn & Ames, Gait, Cal.
505,480.—EXCAVATOR—W. M. Gross, Spokane, Wasb.
505,605.—RAILWAY CONDUIT—C. W. McNear, Oakland, Cal.
505,575.—GYROSCOPE—J. N. Rowe, Seattle, Wasb.
505,544.—VEHICLE TOP—J. U. Tabor, Los Angeles, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

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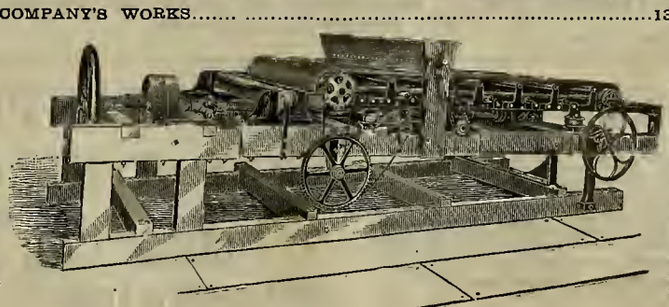

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You have a good concentrator, and it can be relied upon to handle any ore that will concentrate. I most heartily recommend it to the mining public. Yours respectfully,

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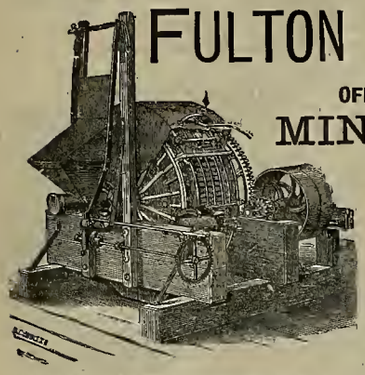

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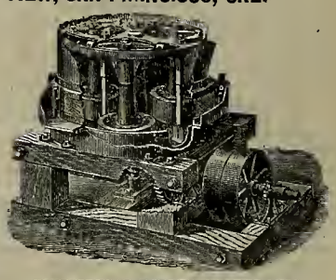

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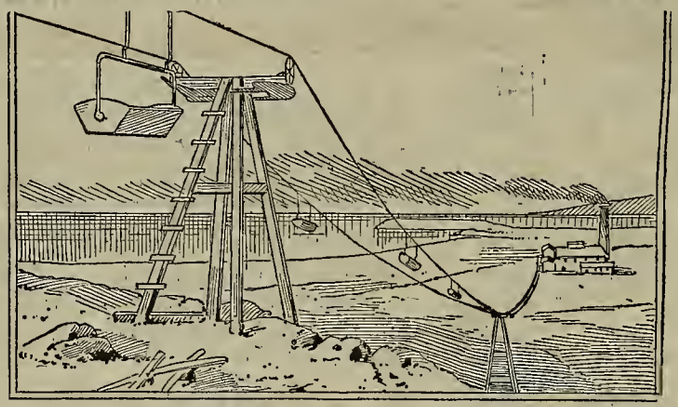

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Mechanics and Popular Science.

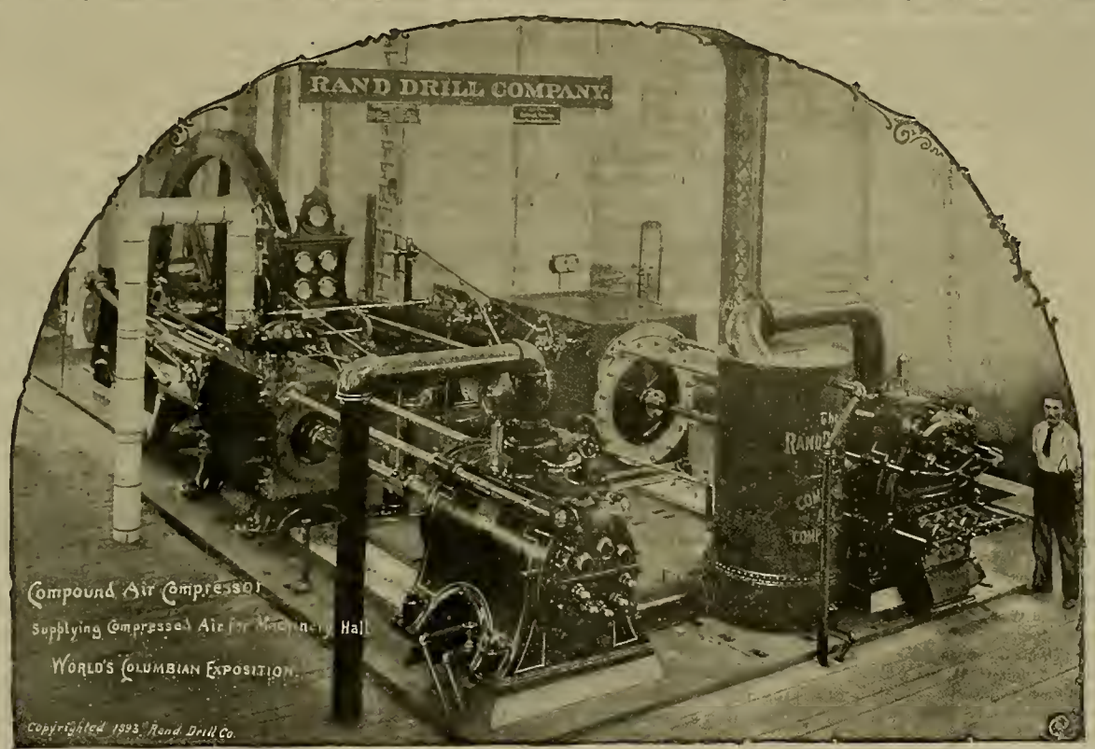
VOLUME LXVII.
Number 16.

SAN FRANCISCO, SATURDAY, OCTOBER 14, 1893.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

The Rand Air Compressor.

One of the very interesting exhibits in Machinery hall, at the World's Fair, is a large air compressor in operation, supplying air to work other machinery. It was installed by the Rand Drill Company. It is of special interest to large mine owners and others who have occasion to use this class of machinery. The compressor is a compound, both air and steam; it is fitted with a componnd condensing Corliss engine of the latest design, connected to a crankshaft and heavy fiywheel. The piston rods passing through the back head of each cylinder connect with the piston rods of the air cylinders. The dimensions of the cylinders are: steam high-pressnre, 22 in.; steam low-pressure, 40 in.; air low-pressure, 32 in.; air high-pressure, 22 in.; diameter, all 48-in. stroke. In action the air is taken into the low-pressure air cylinder and compressed to a pressure of between 25 and 30 lbs. per square inch; it then passes through a water jacketed receiver and into the high-pressure cylinder, where it is compressed to as high a pressure as is required. The pressure reqnired is regulated by a device acting directly on the cut-off mechanism, in connection with the governor; it is connected with the same shaft as the governor, but does not interfere with it or its action. The pressure of air is recorded daily by a recording gauge, and an examination of the cards which are kept on file shows how closely the compressor is regulated to maintain a uniform and constant pressure of air at a given point.


RAND DRILL COMPANY.
Compound Air Compressor
Supplying Compressed Air for Machinery Hall
WORLD'S COLUMBIAN EXPOSITION.
Copyrighted 1893, Rand Drill Co.

RAND DRILL CO.'S COMPOUND CONDENSING CORLISS STEAM ENGINE DRIVING COMPRESSED AIR CYLINDERS.

An ingenious contrivance for gold washing has been devised and is in use on the Snake river, near Ontario, Or. A large vertical wheel, supported on two parallel and connecting scows, anchored firmly in the current of the river — the wheel similar in general to those in use for irrigation—is moved by the current and capable of lifting about three gallons of water per minute to a height of 14 feet. This volume of water is projected on the gravel brought from the bar, forcing it through a modified form of "grizzly." The coarser portions are thrown into the river; the finer particles, consisting of black sand, small rubies and gold flakes, flow downward in a reverse direction through a wide, shallow trough, laid with heavy burlap, the rough surface of which is designed to arrest the fine gold.

The increased activity in the gold mines of Colorado is shown by the record of bullion operated on by the Denver Mint for the three months ending Octoher 1. The total is $511,549.08. In handling this bullion $4,912 81 in silver was taken out, making the total amount of gold and silver handled from the State $516,461.89. The total amount of bullion handled by the same mint in the twelve months of 1892 was $1,120,025.04, making an average for each quarter of $280,006.24, against $516,461.89 of the quarter jnst closed.

No "official programme" of the State Miners' Association was circulated at the late convention; but there was a "programme," which was compiled as an advertising dodge without the sanction of the association or any officer thereof. No one could offer any reasonable objection to such a scheme if it cost the convention nothing and was not more than it pretended to be. It seems proper to mention, however, that this particular programme did not emanate from and was not published by this office, or any one connected therewith. Such impression might have been created by the fact that several of the articles printed in the programme—"History of the Miners' Movement," etc.—appeared originally in this paper, and were appropriated bodily without credit or acknowledgment of any kind—a proceeding that was both cheeky and dishonest. It is to be hoped that future "programmes" will be issued on a more creditable basis.

Director of the Mint Preston inclines strongly to the opinion that the present annual output of gold will be more than maintained in the future. It has shown a steady increase since 1874, when it reached its lowest ebb, and in view of the impetus given to gold mining by the fall in silver and the rich developments in South Africa, the increase is likely to be at least $10,000,000 greater this year than it was last year, the excess in this country being $3,000,000 to $4,000,000, and in Africa $5,000,000 to $7,000,000.

Going to the Transvaal.

There is no doubt that the Transvaal, in South Africa, is a country very rich in gold and certain to be one of the largest producers of the yellow metal in the world. The output has grown at an astonishing rate. In a few years a city with 30,000 people (Johannesbnrg) and a prosperous and populous country have been literally carved out of the wilderness. Large sums of capital have been invested and hundreds and thousands of laborers employed. The transformation has been going on for several years but it is only recently that the fame of the Transvaal has reached all quarters of the globe. In consequence, thousands of immigrants are being attracted thither. Four hnndred miners have recently gone from Montana and a colony is about to start from Sonoma county, in this State. It is probable that these people have not sufficiently informed themselves of the actual state of things in the Transvaal. The labor situation there is not promising. The Johannesburg *Sentinel* is said (we quote second-hand) recently to have declared that there is "no demand" for carpenters, masons, bricklayers, plasterers and blacksmiths. The country is "overstocked" with fitters, miners, wagon builders, tailors, hakers, dressmakers and waiters; "badly overstocked" with engine drivers, house decorators, painters, printers and shop assistants. The situation as to clerks is described as "terrible," the cab drivers are mostly colored, and the teachers are "poorly paid." There is, however, "plenty of room" for good white domestic servants. The rent of a three-room cottage is from $35 to $40 a month, and good table board is from $8 to $10 a week.

In San Francisco at the present time Dr. J. W. Matthews, F.R G.S., who has lived 25 years in South Africa is lecturing on the Transvaal. Here is what he says about one feature of living there:

"The duties on imports are very high. For instance, on every cigar a man smokes he must pay a duty of 6 cents. All cigars are brought from Havana, and their average cost is 36 cents. On hams the duty is 24 cents a pound, making the total cost 60 cents a pound. On every banana taken into the country the Government collects a tax of 2 cents. These are only instances of the tremendous rate of customs."

Notwithstanding these disadvantages, great fortunes have, of course, been made. But they are not as a rule made by laborers. The gold-bearing reef is very much limited in area, and no doubt claims are not to be had for the asking.

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San Francisco, October 14, 1893.

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HON. S. K. THORNTON.....Vice-President
W. C. RALSTON.....Secretary
W. W. RODEHAVER.....Ass't Secretary
JULIAN SONNTAG.....Treasurer

EXECUTIVE COMMITTEE.

Appointed by Chair.

Charles G. Yale, S. J. Hendy, S. B. Christy, Edward Coleman, E. A. Belcher, A. J. Ralston, B. F. Dunham, W. W. Montague, A. S. Hallidie, John Bermingham, Thos. R. Church,

From the Counties.

Amador—E. C. Voorhies and J. F. Parks.
Alameda—John T. Bradley and Felix Chappellet.
Calaveras—S. Poorman and Edward Taylor.
Butte—Frank McLaughlin and A. Ekman.
Sierra—Dan T. Cole and Frank R. Wehe.
Nevada—J. S. McBride and Alf. Tregidgo.
Placer—J. E. Doolittle and Charles F. Hoffman.
Tuolumne—J. W. C. Maxwell and W. H. Martin.
Shasta—J. E. Lyon and J. H. Morton.
Trinity—John McMurray and O. M. Loveridge.
Siskiyou—R. H. Campbell and Andrew G. Myers.
Yuha—William B. Meek and James O'Brien.
San Francisco—John C. Coleman and S. K. Thornton.
El Dorado—G. W. Cummiogs and J. J. Crawford.

MIDWINTER FAIR COMMITTEE.

The following names were presented from the several counties ot constitute the committee:

Amador—A. B. Call, George Heazelton and James H. Tibbetts.
Alameda—A. J. Ralston, H. G. Blaisdel and Grant I. Taggart.
Calaveras—S. Poorman, I. H. Reed and S. S. Moser.
Butte—Frank McLaughlin, A. Ekman and L. L. Meyers.
Sierra—To be announced hereafter.
Nevada—George Mainhart, S. P. Dorsey and Fred Zeitler.
Placer—J. E. Doolittle, Harold T. Power and B. F. Hartley.
Tuolumne—Charles S. Fitch, D. R. Oliver and John H. Neal.
El Dorado—G. W. Cummings, E. M. Fitzgerald and J. W. Estes.
Shasta—Joseph Bell, A. B. Paul and R. M. Seltzer.
Trinity—To be announced hereafter.
Siskiyou—John Daggett, R. H. Campbell and James Vance.
Yuha—James O'Brien, William B. Meek and Joseph Durfee.
San Francisco—S. J. Hendy, William Johns and F. Chappellet.

The General Executive Committee was authorized to fill all vacancies, and the Chair said the matter of appointing the Central Committee was so important that he desired more time to think over his appointments.

THE Idaho mine, Nevada county, has just declared another dividend of $9 per share. There are 3100 shares of stock in the mine, so the total amount of the dividend was $27,900. The dividend declared was from reserve cash on hand and from what the Maryland Company has paid to the Idaho under the terms of the agreement entered into last May. The dividend is No. 277, and the full amount declared from the first up to the present dividend is something over $5,024,000. The gross proceeds of the mine and other sources of revenue connected therewith are about $11,750,900.

A Notable Convention.

The miners' convention fully realized all expectations in point of attendance and in interest; and in results it was quite as important as either of its predecessors. It was strictly a business session from start to finish. There was little sentiment and much work. The delegates were animated by a single purpose, and that was to put their views on various questions affecting their interests in concrete form, that they might have favorable effect upon proposed Congressional legislation. The session was harmonious in the extreme. No mistakes were made and no element was left dissatisfied and unrecognized.

The work of the convention may be summed up briefly. The Stewart bill was the principal object of attack. The convention placed itself on record as opposed to several of its important provisions, the objections to which have heretofore been fully indicated in this paper. But it favored other provisions. For instance, the following, now in the Stewart bill, were indorsed: "Provided, that the presence of rock in place bearing gold, silver, cinnabar, petroleum or other valuable mineral, shall be regarded as presumptive evidence that the land containing the same is, and always has been, mineral in character. And provided further, that in investigating the character of land with a view to ascertaining whether it is more valuable for mineral than agricultural, evidence may be taken of the mineral discovered or developed adjacent to such land, proof of which shall be presumptive evidence that the land in question is mineral in character. And provided further, that wherever land is proven to be within a well-defined mineral belt, such land shall be deemed, presumed and taken to be and to have been mineral land, unless the contrary is proven."

The great importance of the incorporation of these provisions in the revised statutes of the United States is apparent. It means a complete change in the policy of the Government toward miners, as exemplified in the rulings of the Land Department. As it is now, the miner is compelled, in making application for patent, to prove that mineral land is mineral land—in other words, to demonstrate that black is black or white is white. The presumption is against the miner, and in favor of anybody and everybody else. All land in mineral districts is agricultural land until it is fully and elaborately and conclusively shown to be mineral land.

These provisions contain another significant feature. Land in mineral belts shall be considered to be and *to have been* mineral land until the contrary is shown. It is part of the intent of this declaration to give full effect to the intent of the land grant to the Central Pacific, which expressly excepts mineral lands from the gift of the Government. Under the decision of Judge Sawyer, in the Eagle Bird case, however, the railroad company claims all land not known to be mineral land at the time of the grant (1862).

The action of the convention as to hydraulic mining was equally important. The exact sum ($1,030,000) recommended by the Government engineers for impounding works was asked for; and an amendment to the Caminetti Act was further suggested providing that hydraulic mining may be undertaken with no impounding works whatever, if it appears to the Debris Commission that no material injury to others will result.

The convention was a notable one, and it is likely to mark an era in the history of mining in California.

THE new Director of the Mint, R. E. Preston, recently furnished Congress with the following table, showing the decline in the price of silver since 1873, when the dollar was dropped from our coinage:

YEAR.	Value of fine ounce at average quotation.	Gain or loss per cent.	Bullion value of a United States silver dollar.	Gold ratio.
1873	$1.30	0.45 gain	$1.004	15.9
1874	1.28	1.00 loss	.989	16.2
1875	1.25	8 00 loss	.960	16.6
1876	1.16	10 00 loss	.890	17.9
1877	1.20	7.00 loss	.920	17.2
1878	1.15	10.00 loss	.890	17.9
1879	1.12	13.00 loss	.889	18.4
1880	1.14	11.00 loss	.886	18.0
1881	1.14	12 00 loss	.889	18.1
1882	1.13	12.00 loss	.878	18.2
1883	1.11	14.00 loss	.868	18.6
1884	1.11	14.00 loss	.880	18.8
1885	1.06	18.00 loss	.820	19.4
1888	0.99	23.00 loss	.789	20.8
1887	0.98	24.00 loss	.757	21.1
1888	0.94	27.00 loss	.727	22.0
1889	0.93	28.00 loss	.720	22.0
1890	1.05	19.00 loss	.809	19.7
1891	0.99	23.00 loss	.760	20.9
1892	0.87	33.00 loss	.670	23.7
1893, eight months	0.81	37.00 loss	.626	25.5

Work of the Convention.

[By Hon. Tirey L. Ford, Chairman of the Committee on Legislation.]

In response to your request for my views concerning the results likely to flow from the recent annual meeting of the California Miners' Association, I would say:

The above association was organized in January, 1892, less than two years ago. At that time one branch of mining had been so seriously crippled that the miners had about abandoned all hope of its rehabilitation, while the industry as a whole seemed to be languishing. The organization of the State Association brought the miners of California into a closer relationship than had ever before existed since the discovery of gold in California. As a result, puhlic attention was directed to the needs and condition of the mining industry in this State and the serious loss to commerce through the limitations that had been unfortunately placed upon the production of gold. The cause of the miner was promptly presented to Congress and a law secured recognizing hydraulic mining as a legitimate industry and creating a Federal Commission to supervise and regulate that branch of mining in California. Our State Legislature was not less prompt, and, when its last session adjourned, it left upon our statute-books two laws by which the State not only recognized the legitimacy of the business of hydraulic mining, but pledged financial aid to the extent of a quarter of a million of dollars to aid in its rehabilitation, conditioned only upon an appropriation of at least as much by the General Government. In the meantime came the famous Gilbert decision in the North Bloomfield case, which, in substance, laid down the rule that hydraulic mining might be carried on when no material injury resulted therefrom, and further recognized the efficacy of artificial works for the restraining and impounding of mining debris. These results had all been accomplished in but little more than a year, and the miners began to feel that their day of deliverance was not far distant. Always obedient to the law, the miners had an abiding faith that justice would yet be done them through the medium of the law. The results thus far accomplished justify that faith, and there now seems little doubt that full and fair justice will be done those who builded a commonwealth and saved a nation's credit at the most trying period of its existence.

When the recent convention at Pioneer Hall was called to order the president was able to refer with pride to the achievements of the past, and to predict with confidence the success of united efforts in the future. The members of that convention had grown wise with experience and at once proceeded with the matters before them. Three matters of special importance engaged their attention.

First, in order to carry ont the original intention of the framers of the congressional act known as the Caminetti Act, it was necessary that an appropriation should be made by Congress to at least an amount equal to the appropriation made by the last session of our Legislature, and above referred to. The expenditure of these joint appropriations by the State and nation would subserve the two-fold purpose of protecting our navigable rivers from the natural causes that operate to their injury, and of permitting the resumption of hydraulic mining without material injury to other interests, in accordance with the Gilbert decision and the enactments of the last session of our State Legislature. It is not believed that such an appropriation will be opposed by the valley farmers, since they will receive a direct and lasting benefit therefrom.

Second, the so-called Stewart mining bill, while containing many valuable amendments to the present Federal law relative to the acquisition and holding of mineral lands, contains also some provisions that would undoubtedly work grave hardships upon the mineral claimant. The Miners' Association at its recent meeting set forth clearly the wishes of the miner with reference to these matters, and a committee was appointed to draft a proper measure to be presented to Congress. The miner asks nothing but fair treatment at the hands of the Government and its officers. If I should locate a mining claim in the Sacramento valley in a well-recognized wheat-growing belt, I should expect, in a contest with an agricultural claimant, that the land in controversy would be presumed to be agricultural in character until the contrary was proven, and it is but fair and decent justice to indulge the same presumption as to the mineral character of land within a well-known and well-defined mineral belt.

Third, the rulings of the Commissioner of the General Land Office have been a source of constant annoyance to the miner in his efforts to obtain title to his property. An effort will be made to correct this serious evil.

Another matter which just now is of pressing and vital importance to the mining industry of this State is the necessity of a proper exhibition and illustration of the mineral wealth of California at the approaching Midwinter Fair. This was not neglected at the recent meeting of the

association, and will be properly looked after by a committee appointed for that purpose.

After the disasters and depressions of a decade, the miners find themselves once more united, buoyant and hopeful. Their respect for, and obedience to, the law, have challenged the admiration of the country, and the justness of their cause appeals to that sense of fairness and justice that is typical of the American people. So long as the miners of California keep up an energetic and active State organization, backed by wide-awake county associations, just so long will their cause receive that consideration to which it is so justly entitled, but which can be obtained only through united and persistent efforts.

I should feel that I was negligent in the performance of my duty as a miner did I not take this occasion to say, in behalf of the miners of California, that to Governor Markham, more than to any other one man, is due the change of sentiment that has swept over the State with reference to the mining industry. He was our friend when we needed a friend, a fact the miners of California will never forget. TIREY L. FORD.

Compromise or Nothing.

The silver repeal debate at Washington has resolved itself into a contest of physical endurance, and the silver men have altogether the best of the situation. While the repeal advocates are probably in a majority, they find it impossible under the traditions of the Senate to terminate the debate by cloture. In this case, the minority is active, stubborn and disposed to take every possible parliamentary advantage. The repeal men have resorted to a "continuous session" expedient, in hope of wearing out the patience of their opponents and forcing them to a vote; but it is not at all likely that the issue can be directly forced in that manner. The result will probably be an agreement of some sort, and agreement is compromise. Indeed, it is practically settled that unconditional repeal is dead; and the only question now is as to terms.

Various measures have been broached, but the true solution to the problem has probably not yet been suggested. Senator Squire of Washington has offered a bill that meets with some favor. It is in substance that the owner of bullion and product of mines or refineries in the United States may deposit it at any mint in an amount not less than $100 in value, to be coined into standard dollars of the present weight. There shall only be paid to the person depositing the bullion such number of dollars as are equal to the commercial value of the silver bullion on the day of deposit, the difference between the commercial value and the mint value to be retained by the Government as seigniorage. The deposits of bullion for coinage are not to exceed $2,000,000 per month, and when the number of silver dollars coined shall have reached the sum of $100,000,000, further coinage shall cease. The seigniorage is to be retained in the Treasury as a reserve fund for the purpose of maintaining the parity of every dollar issued under this Act. While it is not to be expected that an agreement will be reached in precisely this form, it may afford a basis upon which a compromise measure may be wrought.

The end is doubtless in sight, so far as the Senate is concerned. What the House will do is another question. It may reject wholly any suggestion of compromise by the Senate. But the alternative now seems to be either compromise or no legislation.

Slickens.

SHASTA COUNTY wants a local smelter. The output of refractory ores in that county is large, and it is argued that the investment would pay.

THE "burlap" process for saving fine gold is said to have been introduced on the Rio Grande gravel bars, and to be yielding a profit of $3.50 per day per man.

MINERS are said to be leaving Butte by the hundreds for South Africa. One week, recently, 400 tickets were sold to parties bound for the mining region of that distant country. The price of the tickets is $128.

LOUIS NAPOLEON BEAUREGARD, foreman of the Judson Works, died of cancer Oct. 3d. Mr. Beanregard was the inventor of the "C" spring, and his name appears in the Patent Office reports in over 30 patents of machinery.

THE Center Gravel-Mining Company at San Francisco has been incorporated. Capital stock $10,000, with H. J. McLerie, W. G. Roberts, C. A. Malm and A. H. Winn of San Francisco, and J. O. Whitney of Oakland as directors.

EVERY stamp mill at Gilpin county, Colorado, is said to be pounding ore. Every hole and shaft, too, which contains any ore that can be made to pay, has men in it at work. There is talk, too, of erecting a new mill for custom work, which will have 200 stamps.

THE directors of the Morning Star mine of Iowa Hill have just declared a dividend of $1 per share, aggregating $2400. The amount is somewhat less than the usual dividend, owing to extensive improvements being made at the mine, but the mine itself is even richer than ever, and bigger dividends may be looked for.

THE silver output of Arizona will exceed the output of gold by many hundred thousand dollars this year, says the Mohave *Miner*. The Territory, if admitted as a State, would cast her maiden vote in Congress in the interest of silver. The statement sent out that Arizona is favorable to gold mono-metallism is false as well as absurd.

NEARLY every shipment of treasure from Central America heretofore has been of silver. Monday the steamer San Jose, which arrived from Panama, had several entries of gold bullion or gold dust on her manifest. There were two packages of gold from La Libertad, amounting to $25,000, one from Corinto valued at $1230, and one from Tumaco worth $1650.

THE Home Mining Company, at Deer Creek, Nevada county, advertises that it will receive bids until Saturday, the 21st day of October, 1893, for sinking 100 feet of shaft on the Home mine. The shaft is to be 8x5 in the clear. Contractors are to furnish their own powder, candles and fuse. The company is to furnish the balance required for the work. Three shifts will be required.

THE union miners of Canyon Creek, Wallace, Idaho, have decided to go on with their strike and not accept the tender of the mine-owners for $3.50 per day for miners and $3 for carmen and shovelers. The Butte union, which has loaned the local unions considerable money, sent in delegates and demanded that the strike be carried on. The mine-owners say that they will put competent men to work as fast as they can get them.

THE San Juan Mining Company, to carry on business in California and Lower California, has incorporated with a subscribed capital stock of $24,000. The stockholders and the amount held by each are as follows: F. A. Schneider, Santa Clara county, $3375; H. W. Schramm, San Francisco, $3375; Jose G. Moraga and Jobentino Moraga of Santa Barbara county, and Charles Cranz Jr., William S. Cranz, F. F. Cranz and T. E. Gallup of San Francisco, $3000 each.

THE Juneau City *Mining Record* reports that placer mines have not done very well on the Yukon this season. At Franklin, Miller and Davis creeks the returns have been small. The *Record's* informant, a miner who has just returned, says: "As a rule the diggings in the Yukon are very low and will not average more than a bare living. I think there will be all of 100 men coming out this fall, some over the Summit and others down by St. Michael. Henkuk river is now the mining place. Mr. Bettles has started a trading post 600 miles up the river, but the diggings are 250 miles farther up still."

AN apparatus for blowing a whistle by air is being constructed at the Miners' Foundry for use at one of the mines in this district, says the Nevada *Transcript*. It consists of a large tank with a small and very sensitive whistle attached. Connected with the tank will be two pipes, one letting water into the tank, the other allowing it to be drawn off. The tank is air-tight. When the water is turned on the air is compressed and by means of a valve is conducted to the whistle, the pressure obtained being sufficient to produce a good blast on the whistle. The water is then drawn from the tank, and everything is ready to blow the whistle again.

THE manager of the Harqua Hala mine reports for August to the English directors: The mine throughout looks well, and promises to fully bear out the expectations predicted as a valuable dividend producer. The mill started work at 6 o'clock on the evening of the 11th with 15 stamps, and on the morning of the 12th we ran all the stamps till the morning of the 31st, when we shut down to examine the boilers, which were showing signs of mud accumulations. The mill ran 19 days and crushed 1875 tons; amalgam cleaned up, 252 pounds; approximate value, $25,000; approximate expenses, $7000; estimated profit for the month of August, $18,000. Tailings: I took four samples of tailings during the month and sent them to San Francisco for assay, with the following results: No. 1 contained $1.70 in gold; No. 2 contained $1.70 in gold; No. 3 contained $2.20 in gold; No. 4 contained $3.80 in gold; average, $2.35.

THE dynamite question has been a perpetual "thorn in the flesh" of the South African mining industry. A monopoly formerly had the sole right of importation, and it fleeced the companies by reason of the exorbitant price of the explosive imported under its provisions, and risked their workmen's lives by its bad quality. Now a still more thorough-going measure of the same sort is proposed. The Volksraad has sanctioned the concession of the sole right of selling dynamite to a company which will be bound to produce it in the republic. The price is to be £5 per case, as against £4 15s at which it has been obtainable since the recision of the former monopoly. The Johannesburg Chamber of Mines is very indignant in the matter, and has even been hinting at an uprising on the part of the mining population. The miners, however, seem to entertain some doubt as to the chamber's motives; at all events they repel any suggestion of revolution. As this session of the Volksraad has also resulted in an additional duty of 1d per pound on sulphuric acid, a tax which will probably mean $100,000 a year extra working expenses for the gold-mining companies—it cannot be said to have verified the President's liberal promises of more generous treatment.

Foundry Notes.

The Pelton Water Wheel Co. have recently sent a power plant to Mexico which has some features of unusual interest. The plant embraces two 67-inch three-nozzle Pelton wheels having a capacity of 700-horse power running under a head of 100 feet. This station is intended to operate a jute factory located at Barrio-Nuevo, in the State of Orizaba, some 60 miles inland from the port of Vera Cruz. These wheels are to be connected to four electric generators and the power transmitted to the factory, 1½ miles distant. No line or counter shafts are to be used, but every machine will be run by a separate motor varying from 1 to 20-horse power, as required. Pelton regulators are attached to the wheels, which will give a uniform speed under all variations of load. This is the first factory in the world on a large scale to be run exclusively by electricity with an entire absence of shafts and belt connections. This new departure will therefore be watched with the greatest interest.

The State Miners' Convention.

The annual convention of the State Miners' Association was held in this city Monday and Tuesday, October 9th and 10th. The attendance was satisfactory and results are likely to be important and for the permanent and substantial benefit of the miners. It was strictly a business session, proceedings being confined almost wholly to matters within the immediate view of the convention. Little time was devoted to oratory and generalities, and the Anti-Debris Association, which is generally present at miners' assemblies in the spirit or in the flesh, or both, escaped with bare mention. It is an ancient bugaboo whose shadow is rapidly vanishing. Its influence on the late convention extended only to the familiar matters of legislation and judicial decisions determined in the past. So far as the sentiment of the miners was expressed on the subject, it is not a factor to be seriously regarded for the future.

The chief events of the convention were the adoption of resolutions criticising in a specific manner the Stewart mining bill and asking Congress to appropriate $1,030,000 for the construction of Government impounding works upon the tributaries of the Sacramento and San Joaquin rivers, and the formulation of a bill therefore; the endorsement of the Midwinter fair, and the preparation of an elaborate mineral exhibit thereat; the speech of Judge Niles Searls and the speech of Ex-Senator Cross. Other matters of more or less importance came up for consideration and action.

The place of meeting was Pioneer hall, which had been arranged tastefully for the occasion. Silken banners were disposed in various places indicating the seating places of the delegations. Every mining county except Plumas was present by its delegates and the number of proxies was comparatively small. There were a number of spectators.

President Neff Opens the Convention:—In calling the convention to order the president spoke as follows: "The objects of this convention are fully set forth in the call which will be read to you, so I will not detain you with extended remarks. But I wish to congratulate you on the favorable auspices under which you meet this year. Three years ago the mining industry was flat on its back, and the miner had lost heart. He had nothing but his little cottage and his few acres, and was compelled to eke out a living from his patch of garden truck, His mine was closed and the future looked very black.

"Then in a happy moment some people thought of forming an association whose object should be to help the miner and harmonize the two great conflicting interests in the State. The association was formed, a convention held and a bill formulated. This bill was sent to Washington and a committee was sent to urge its passage through Congress.

"The bill was passed. It is now a matter of history. Though not altogether satisfactory to every miner, it is a big step in the direction of rehabilitating the mining industry, and has gone a long way toward solving the problem of how to open the mines without injuring the agricultural interests. The differences between the farmer and miner are now in the hands of an honest and fair commission. But it is necessary to have this bill changed in some minor particulars. It has been found that it needs further amendment to help out the small miner. We also desire an appropriation to carry out the provisions of the bill. These are some of the matters to come up for your consideration, but I will not enumerate them further, as the secretary will read the call for the convention, which sets them out in full."

Preliminary Work Begins.—The secretary then read the call for the convention, heretofore published in the MINING AND SCIENTIFIC PRESS.

J. A. Filcher of Placer county moved the appointment of a committee of seven on credentials. Carried.

Senator Ford of Sierra moved the appointment of a committee of fifteen on legislation, and that all matters relative to legislation be referred to the committee without debate.

This motion brought A. Burrows of Nevada to his feet. He objected to the motion. The size of the committee was too large, and he didn't like the way it was proposed to gag the convention by shutting off debate. Mr. Burrows explained his position in some detail.

Judge Fulweiler of Placer found it hard to believe that Mr. Ford intended to gag the convention. He suggested that debate would of course be permitted after the resolutions had been reported back from the committee.

Senator Ford explained that he had desired every part of the State to be represented on the committee, which was an important one, and that was why he placed the number at fifteen. Besides, it followed the precedent of previous conventions. There was no desire to introduce gag law. The design of the motion was simply to expedite business. Half a dozen resolutions on the same subject might be introduced and the convention might engage in an unprofitable discussion on all. Let the committee receive, digest and prepare them for the convention. Then debate would be proper and desirable.

Mr. Filcher also helped to remove Mr. Burrows' objections, and the latter gentleman finally acquiesced and the original motion carried.

Ex-Senator C. W. Cross moved the appointment of a committee of five on order of business, and Julian Sonntag, at the Chair's suggestion, moved the appointment of a committee on ways and means, stating the necessity for raising money to defray expenses.

Slickens as a Fertilizer.—At this point a ripple of amusement was created by the presentation to the convention of an enormous tomato raised on slickens, and a letter from E. J. Rector of Nevada City. "This," said the writer, "is but one of the many evidences that slickens is most valuable as a fertilizer." The slickens was from the old Manzanita mine, and the tomato weighed two pounds and was seventeen inches in circumference.

The standing committees (the names in full appear in another part of this report) were then announced by the Chair.

Recess till afternoon was then taken, to give the committee on credentials time to examine the list of delegates. It made its report after the opening of the afternoon session.

Election of Officers.—The nomination of officers being then in order, John McMurray of Trinity moved the unanimous election of Jacob H. Neff of Placer for president. The motion was carried amid great applause.

Mr. McMurray nominated Samuel K. Thornton of San Francisco

for vice-president; Richard I. Thomas of Nevada, in a fervid speech, nominated W. C. Ralston, the incumbent, for secretary; W. W. Rodehaver of Placer was nominated for assistant secretary by R. F. Burns of Placer; Julian Sonntag of San Francisco was nominated for treasurer; and all the nominations were accepted by the convention, which voted by acclamation.

On motion of J. M. Fulweiler of Placer, the constitution was amended so as to make each county's representation on the Executive Committee two instead of one.

The Committee on Ways and Means made a report recommending that each county association be assessed in a sum equal to $1 for each enrolled member of the association, and that $2 be assessed against each delegate to the convention. It was explained that the first assessment was not against individual members in the counties, but against the associations as a whole. Adopted.

Reports of officers were read.

The Midwinter Fair.—The president then introduced Mr. M. H. de Young, director-general of the Midwinter Fair, who, in a speech of some length, explained the scope of the fair and urged the miners to make an adequate exhibit. The central idea of Mr. de Young's address was that quantity was more to be desired than quality. A ton of ore in bulk makes a greater impression upon a visitor than a small specimen, however rich.

On motion of Samuel J. Hendy, it was decided to appoint a committee of three from each county to collect specimens and arrange for a fine mining exhibit.

A South African in California.—At the close of Mr. de Young's speech, Dr. Mathews of South Africa was invited to address the assembled mining men. He said that he did not claim to be a practical miner, but he had lived for 25 years in the Transvaal of South Africa, and so knew well of what he talked. Twenty years ago an expert returned to London from South Africa and said there were no diamonds in that country. Since then that country has produced £325,000,000 worth of diamonds, and they have been placed on the markets of the world. "I now want to assure you," said he, "that Africa is the future gold-mining country of the world. The mines there are enormously rich, and are now producing at the rate of 125,000 ounces a month. I do not want to disparage the golden wealth of California, but as miners I know you are interested in mining wherever it is carried on. I lectured in Chicago on the gold mines of Africa, and intend doing so here, and I assure you that the great dark continent conceals wealth of which no man dreams, and of which only a portion has been uncovered.

"This State should, in my opinion, do its utmost at the coming Midwinter Fair to display to the world its mineral wealth, and I can but be convinced of the great good it will do you."

Mr. Mathews thanked the convention briefly and made way for Prof. Christy, who was summoned to the platform by Chairman Neff. Prof. Christy of the State University, though taken by surprise, said he was anxious to re-enforce the remarks of Mr. de Young with regard to the need of making a fine exposition of the mineral wealth of this State at the Midwinter Fair. At some length he told about the workings of the mining department of the State University, which has graduated more students than any similar institution in the United States with two exceptions. The professor also spoke of the deposit of debris by the rivers from the hydraulic mines, and declared that the question of controlling the debris was an engineering problem which had been successfully solved.

The convention shortly afterward adjourned until Tuesday at 9:30.

SECOND DAY.

The convention was slow in assembling the second day. The Committee on Resolutions had had a long siege the night before, and the members were naturally in no hurry to begin work the next day. At 10 o'clock the gavel dropped, and the business of the session began. The first really important business was the appointment of the Executive Committee. The name of each county was called, and the men were promptly named.

A dispatch from Thomas R. Bard to John B. Treadwell was read by the chairman: The message, dated at Santa Paula, Cal., requested Mr. Treadwell to represent the petroleum interests of the State at the convention. On motion of J. M. Walling of Nevada City Mr. Treadwell was seated as a delegate from Ventura county.

Several resolutions were here introduced by Mr. Charles G. Yale and others and were unanimously adopted.

Mr. Burrows Defends Senator Stewart.—The report of the Committee on Legislation was then called for and was read by Chairman Tirey L. Ford. When the reading was finished, A. Burrows of Nevada City, who had already pretty well established himself as the combative spirit of the convention, began a long speech against the report, and particularly that part criticising the Stewart bill. "I don't believe in all these strictures on the Stewart bill," declared Mr. Burrows. "The only friend of the miners in the upper house of Congress, except Perkins, is Stewart. When the hydraulic mining question came up he championed their cause." Mr. Burrows then told how Senator Stewart had written to various mining lawyers and others, asking for suggestions for his bill, and how one proposed by himself had been cheerfully incorporated. "This convention should not undertake the wholesale criticism of the bill," he continued. "There are some objectionable features, I admit. For instance, the area of a placer claim should not be restricted to forty acres, but it ought to be 160. If we attempt to change the whole thing, we will get nothing." One of the good features of the bill defended by Mr. Burrows was the clause against fraudulent relocations. It was favorable to the bona fide development of claims. Stewart declares that claims upon which no assessment work has been done shall be relocated on midnight of December 31 each year by the same persons. He also defended the provision about giving notice in case of contest.

Col. Keown of Placer here arose and interrupted Mr. Burrows, criticising him for taking up the time of the convention by his objections, when he was a member of the Committee on Legislation and had not even taken the trouble to attend the session of the committee and state his objections there.

Mr. Burrows said he had been unable to attend, and continued, declaring the bill was good for the quartz miner. "Now," he urged, "don't run amuck against the bill. Let us suggest improvements and they will be adopted." Mr. Burrows agreed with others of the convention that the rulings of the Land Department were open to severe criticism. He cited an instance of the action of a clerk, acting in the name of the Commissioner of the Land Department, who had put him to an infinite amount of trouble in making his proofs on a claim upon which $25,000 had been expended in bona fide improvements. "Why," he cried, "some of these fellows don't know the difference between a gold mine and a sand lot. The fault with these fellows is that they know so many 'things that ain't so.'"

Judge Walling, of Nevada, believed, he said, that no intelligent man could examine the Stewart bill without noticing therein the continuous and additional limitations upon the rights of the miners. This bill is not in Congress now. It is dead. What the miner wants is an application, in the rulings of the Land Department, of the methods by which the miner himself determines if the land is mineral.

Senator Ford said one important point was made in the proposed amendments to the Stewart bill in the addition of the words "and always has been" in stating that land was mineral land. He said the miner frequently ran up against the railroad in attempting to secure his patent. Though his claim might be paying well at the time of application for the patent, the railroad would say, "but was there any mineral showing on it in 1861?" or some other date. So it was necessary to have a provision that the land once demonstrated to be mineral-bearing had always been mineral land.

Then the report of the committee was adopted by an almost unanimous vote, Mr. Burrows casting the only vote in the negative.

The Midwinter Fair Exhibit.—Immediately Mr. Filcher called up the matter of the mining exhibit at the Midwinter Fair, suggesting that the convention decide that the arranging of the exhibit be placed in the hands of an executive committee of five appointed from San Francisco assisted by three members appointed by each mining county. He said it was necessary to "get a move on" as the fair was to open on January 1st, and he moved to reconsider the vote by which the Midwinter Fair proposition carried the day before.

Mr. Searls of Nevada called upon State Mineralogist Crawford to give the convention some ideas on the subject, but Mr. Crawford said he had given the matter no thought, though the State Mining Bureau would do everything possible to make the exhibit a success.

Mr. Filcher's motion to reconsider prevailed, and after some hair-splitting as to methods of appointment the president was authorized to appoint a Central Committee of five from San Francisco and Alameda counties to act with three members selected by the delegates from each mining county to form a Committee on Mining Exhibits.

Professor S. B. Christy said the State University would do everything possible to make the exhibit a notable and gratifying success.

On motion of Judge Walling of Nevada the following committee of three was appointed to draft a proper mining bill for presentation to Congress: Senator Tirey L. Ford, E. A. Belcher and Charles G. Yale.

To Endorse Caminetti.—Mr. Tregidgo of Nevada then introduced a resolution reciting the need of gold from mines, and winding up by commending the work of Congressman Caminetti.

Judge Walling said the resolution was mere buncombe and would not be a credit to the association, though he was not opposed to the sentiment contained in it. On motion of Julian Sonntag the resolution, which threatened to bring on a sharp fight, was laid on the table and the convention took a recess for luncheon.

Upon reconvening Judge Walling moved to take the resolution from the table and the motion prevailed. Then Judge Walling offered a general resolution as a substitute. [The text of both will be found in another part of this report.]

Mr. Tregidgo accepted the amendment, saying he might have been over-enthusiastic in attempting to do justice to any one who had helped the miners in their fight, but if this was buncombe he thought the miners would like more of it. He told of the money he had spent in developing the mines of Nevada county and his work in behalf of the association.

Judge Searls' Address.—After the adoption of the resolution, Judge Niles Searls arose to address the assemblage. He said:

"I don't know whether I ought to have anything to say in this convention ['Oh, yes, you ought, Judge,' interrupted the president, amid cheers]. I occupy a position [Court Commissioner of the Supreme Court] which is supposed to remove me from all the feelings, excitements and prejudices that surround the cause of the miner. But I cannot refrain from saying what I have to say. I am extremely desirous that harmony be promoted among the miners here assembled. At the first convention, nearly two years ago, from which I was detained by illness, it seemed that the farmers were overflowing with the milk of human kindness. I was sick in bed, but so strong was this feeling made manifest by our friends that I was inclined to come down and start in the dairy business. I had the honor to be one of the representatives of the California miners sent to Washington by that convention to advance their interests. I was informed that all was harmony between the farmers and miners. Everything had been arranged and the proposed legislation agreed on. I was told to go on to Washington and meet Devlin and Ohleyer and to formulate a bill in the interests of all concerned. We reached Washington after Devlin and Ohleyer, too late for consultation and too late to appear before the River and Harbor Committee. Only members of Congress were at that time allowed to address the committee; but, through the influence of Congressman Caminetti, we were allowed to appear before the committee. I was informed afterward that, in consequence of the speech of one of the representatives, the committee decided to change the recommendation for the improvement of the Sacramento from $50,000 to $150,000. [The Judge then told of the efforts to prepare a bill upon which the various California interests would agree.] Mr. Devlin stated his objection to the measure fairly and squarely, but Ohleyer said: 'If God Almighty were to come down here and present a bill in favor of hydraulic mining I would not accept it.' There it was fight, and fight we did. We worked around Congress in season and out of season for months as I never worked before, and as I never will again. We did not get all we wanted, but we did accomplish the recognition of the right of the hydraulic miner to live and follow his pursuit. Don't you think that was much? Well, it was. It was a great deal. When this Government recognizes the right of one part of its people to live and prosper, it will defend and advance that interest at all times and under all circumstances. We have made a start, and it will, I think, result in such legislation as will bring about the triumphant success of the hydraulic miner. We do not propose to injure the farmer. As a lawyer, I know we couldn't if we would. We recognize and appreciate the position of the farmers, even though we suspect that some of their representatives get a salary for thinking as they do.

"As to the Caminetti law, we have not accomplished anything in comparison to what we will. We have got an inch now, and when you've got an inch in legislation you can hold onto it till you get a foot. But it will take time. I'll be dead and gone before hydraulic mining is resumed to its former measure. But that time is coming, just the same. To-day mines will start in one place, to-morrow in another, and finally it will be found it can be resumed everywhere without detriment to our neighbors in the valley; and finally universal harmony will prevail." The judge considered the passage of the Walling resolution a recognition of his labors.

President Neff endorsed what Judge Searles said about the labors of the committee in Washington. "Their opportune arrival," he said, "saved everything. We now have a legal standing in court and we are recognized by the United States Government; and not the least who assisted in this service was the honorable gentleman who has just addressed the convention." The president then took occasion to speak in warm terms of Mr. Alf. Tregidgo and his services for the miner.

Chinese Miners in California.—Mr. Charles G. Yale read a statement, compiled from mint statistics, as to the output of small mines and Chinese mines in this State. He presented the following figures for 1892, which, he said, were approximately correct:

Counties.	Small Mines.	Chinese Mines.
Amador	$ 98,600	$ 9,200
Butte	69,612	45,000
Calaveras	76,000	15,585
El Dorado	124,405	57,000
Fresno	100,900	7,000
Humboldt	42,800	16,000
Inyo	17,000	.....
Kern	72,000	16,600
Los Angeles	6,000	.....
Mariposa	.....	.....
Mono	35,000	8,000
Nevada	105,336	92,049
Placer	45,640	152,875
Plumas	96,000	67,000
Sacramento	61,650	58,850
Shasta	35,000	28,000
Sierra	126,700	73,000
Siskiyou	288,990	216,202
Trinity	96,000	136,000
Tulare	.....	.....
Tuolumne	865,000	8,000
Yuba	15,000	5,700
Totals	$1,883,683	$1,042,110
Total gold in State		$2,671,900

Senator Cross' Address.—Ex-Senator Cross spoke of the benefits derived from the Trans-Mississippi Congress, and eloquently extolled the Caminetti law. He also paid a tribute to the United States Debris Commissioners, telling of their wide experience and great engineering achievements. He said the commission had not as yet refused any application to mine after impounding dams had been constructed, and that the members were earnest in their investigations. He told of an instance that day where the commission had granted one of his clients leave to build a dam and go ahead with their hydraulic mining. He said the small mine-owner could operate under the Caminetti bill as well as the great mining corporations. He urged the miners to see to it that they were well represented at the next meeting of the Trans-Mississippi Congress, which will be held in this city next February, as that congress would, by its indorsement of mining, do the miner an immense amount of good.

Replying to a question by C. Runckel of Placer, Senator Cross said he could not explain in a few words what would be the course, if after having obtained permission to construct a dam and go ahead with hydraulicking, the miner were enjoined by the State courts. But he said the miner would have legal recognition, the farmer was committed to the Caminetti bill through his representatives, the bill was a law of the United States, and if a few counties attempted to rise up against that law the law would be upheld even were it necessary to call out the militia, the regular army and the volunteers.

There being no further business to come before the convention, three hearty cheers were given, the band played and President Neff announced an adjournment sine die.

ENDORSING THE MIDWINTER FAIR.

WHEREAS, The Miners' Convention is impressed with the importance to California of the success of the Midwinter Fair; and whereas, from the kind explanation of Mr. de Young, it appears to the convention that a large and well-chosen mining exhibit will add materially to the success of such fair and at the same time illustrate the marvelous mineral wealth of our State; and whereas we fully realize that a State exhibit of minerals, upon a scale commensurate with the resources of California, will add a renewed impetus to the development of her mines; therefore be it

Resolved, That the Miners' Convention pledges its loyal support to the Midwinter Fair, and will by every effort conduce to such a mineral exhibit thereat as shall give to the world a fitting sample of the boundless mineral wealth of the Golden State.

Resolved, That the united effort of the mining community be invoked to aid in the collection of material going to make up an exhibit which in variety and volume shall be worthy of the grand occasion which it is confidently believed will crown the efforts now in progress on behalf of the fair.

Resolved, That the thanks of this convention are due and are hereby tendered to M. H. de Young for his kind explanation to us of the progress being made, and the certain hope of a grand success in such Midwinter Fair.

Adopted.

REPORT OF COMMITTEE ON LEGISLATION.

To the President and Members of the California Miners' Association.—GENTLEMEN: Your Committee on Legislation beg leave to report the following:

1.

We recommend the adoption of the following resolutions concerning the so-called "Stewart Mining Bill," which bill has for its purpose the amending of certain sections of the revised statutes of the United States, relative to the acquisition of title to mining lands:

Resolved, That this association is opposed to any changes in Section 2324 of the revised statutes of the United States, except the following: Strike out the words, "a patent," and insert in lieu

thereof the words "payment of the purchase money and a certificate of entry," in accordance with the Stewart amendment.

Also strike out the following words in the Stewart amendment: "But no re-location of a claim by a person who has already located such a claim, and failed to comply with the conditions of this act in performing work for making improvements, shall be valid prior to such resumption and continuance of work upon such claim."

Resolved, That this association is opposed to any changes in Section 2325 of the revised statutes.

Resolved, That this association is opposed to the Stewart amendment to Section 2325 of the revised statutes, relative to giving a notice in matters of contest, as to the mineral or agricultural character of lands, and desires that the law in that regard shall remain as at present.

Resolved, That it is the sense of this convention that the provisos of Section 2325 of the revised statutes, as contained in the Stewart amendments, should read as follows: "Provided that the presence of rock in place bearing gold, silver, cinnabar, petroleum or other valuable mineral shall be regarded as presumptive evidence that the land containing the same is and always has been mineral in character. And provided further, that in investigating the character of land, with a view to ascertaining whether it is more valuable for mineral than agricultural, evidence may be taken of the mineral discovered or developed adjacent to such land, proof of which shall be presumptive evidence that the land in question is mineral in character. And provided further, that wherever land is proven to be within a well-defined mineral belt, such land shall be deemed, presumed and taken to be and to have been mineral land unless the contrary is proven.

Resolved, That it is the sense of this convention that a new section should be added to the federal mining laws, as follows, to wit:

That the officers of the land department of the Government, in construing the provisions of the law relative to the acquisition of the title of the Government to its mineral lands by its citizens, shall construe and apply the same with great liberality, with a view to aid the applicant in procuring said titles, and that the rules and regulations prescribed by said department for its government and that of its officers in disposing of said lands shall be so formulated and administered as to assist the Government in disposing of said lands to bona fide applicants, and not so as to impede said sales or impose onerous burdens on applicants.

II.

Your committee further recommends that the following bill be presented to Congress and its passage urged, as a means for the better carrying out of the provisions of the present so-called Caminetti Act:

An Act appropriating money for the construction of works to impound mining debris and thereby to protect the navigable streams of California.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress Assembled:

Sec. 1. That there is hereby appropriated, out of any money in the treasury not otherwise appropriated, the sum of one million and thirty thousand dollars, which sum shall be immediately available, and shall be expended under the direction of the Secretary of War, in accordance with the plans, specifications and recommendations of the California Debris Commission appointed under the Act of Congress, entitled "An Act to create the California Debris Commission and Regulate Hydraulic Mining in the State of California," approved March 1, 1893, for the purpose of constructing works for the restraining and impounding of mining debris upon the tributaries of the Sacramento and San Joaquin rivers in California, and the branches of such tributaries.

Sec. 2. Whenever any such works for the restraining and impounding of mining debris shall have been constructed out of such appropriation, or shall have reached such a stage as, in the opinion of said Commission, it shall be safe to use the same, it shall be lawful for said Commission to make the order provided for in Section 13 of said Act, upon proceedings being first had and taken in accordance with the provisions of Sections 9, 10, 11 and 12 of said Act; but, in such cases, the owners of the mines affected by said orders shall not be bound by the proviso to said Section 13 of said Act, nor by the provisions contained in Section 16 thereof.

Sec. 3. The said Commission shall also have power to make the order provided for in Section 13 of said Act as to any mine or mines, whenever it shall appear to the satisfaction of said Commission that no impounding works are necessary (other than the means already provided by nature) to protect from material injury the navigable streams mentioned in said Act and the lands adjacent thereto, upon proceedings had in accordance with Sections 9, 10 and 12 of said Act.

The resolutions were adopted as read.

AN APPEAL TO CONGRESS.

WHEREAS, There is a scarcity of gold in circulation in the United States, which has been caused by unjust legislation in suspending the production of that precious metal in California, wherein it is abundant and where its production was the principal business of the inhabitants of this great State, having produced in the neighborhood of $1,500,000 in gold coin, and contributed largely in sustaining our glorious Union; and, realizing the fact to-day that if its extraction by the hydraulic process was injurious to the agricultural interests of certain parts of the State, it was because the National Government did not make adequate appropriations for the preservation of the navigable streams of the State over which it had sole control, thereby aiding and abetting the production of gold and protecting the agricultural lands of the valleys, at the same time beautifying the Sacramento and Feather rivers; therefore, be it

Resolved, That whatever appropriation shall be made by the River and Harbor Committee for the purpose of dredging and rendering navigable the Sacramento and Feather rivers will be appreciated by the Miners' Association of the State of California; and a vote of thanks be teodered to the Hon. A. Caminetti—a member of that committee— for his untiring zeal and energy in the cause, to encourage him in his good work for the benefit of his constituents, which acknowledgment of his services shall be telegraphed to him forthwith.

This resolution was the subject of criticism, and it was laid on the table and the following substituted:

WHEREAS, There is a scarcity of gold in the United States, caused in part by the fact that hydraulic mining has been suppressed in the State of California, thus reducing the annual production of gold by many millions; and

Whereas, The navigable waters of this State and their protection are wholly under the control of the General Government, and it is the duty of Congress to provide liberally for maintaining the navigability thereof; and

Whereas, Congress has in the past failed to make such provision therefor as the importance of such streams render imperative; and

Whereas, Such failure in the past has resulted disastrously to the hydraulic mining industry of this State; therefore be it

Resolved, That we consider it the imperative duty of Congress to provide for the improvement and protection of the navigable waters by liberal appropriations, thus subserving the double purpose of maintaining said waters for the benefit of our whole people, and at the same time of assisting the miners in the prosecution of a legitimate industry, and any appropriation made therefor will be appreciated by the miners of California.

Resolved, That a vote of thanks is hereby tendered to each and every one of our Senators and Representatives in Congress who have in any manner assisted the miners of this State in their attempts to rehabilitate the industry of hydraulic mining.

Adopted.

APPRECIATION OF THE PRESS.

The California Miners' Association recognizes the valuable assistance it has received from the press of San Francisco and the interior in the effort to arouse increased interest in the gold-mining industry of California. Without this voluntary assistance from the newspapers of the State, it would have been impossible for the miners individually, in the association, to accomplish anything in this direction. The miners have been given every opportunity to plead their cause, so that it is now better understood by the public. Recognition has been obtained for the mining industry of California in the legislature and Congress, and this, we acknowledge with gratitude, has been mainly due to the attitude of the press toward the miners' movement. We have not only been accorded a fair and just hearing, but voluntary advocates have championed our cause and aided us in our efforts. To the press the miners of California are under the greatest of obligations, and it is but just to say, notwithstanding these many favors, that the California Miners' Association has never been called upon to pay, and never has paid, one dollar to any newspaper in the State, or out of it, for championing its cause.

Adopted.

THANKS TO THE BOARD OF TRADE.

The State Mining Convention acknowledges with gratitude the valuable assistance rendered the California Miners' Association by the San Francisco Board of Trade, which, through its exceptionally strong financial and moral support, has greatly advanced the mining industry of the State. It is particularly gratifying that such support comes from a representative body of merchants and business men of the metropolis of the Pacific Coast, since it is evidence of a general desire on the part of the public to encourage the miners and enable them to increase the gold yield of California.

Adopted.

THE SECRETARY'S REPORT.

Following the routine of business the Secretary's annual report was next read, and though it showed no very extensive cash balance on hand it was still accepted as eminently satisfactory and passed upon as such. The report in detail is as follows:

RECEIPTS.

Cash on hand, per statement Nov. 15, 1892	$185 14
Collections at convention, Nov., 1892	505 50
Sale of tickets for banquet, 1892	300 00
San Francisco	2,337 00
Placer county	256 70
Nevada county	250 00
Yuba county	100 00
Sierra county	100 00
Butte county	17 50
State Association certificates	19 00
	$4,070 84

EXPENDITURES.

Palace Hotel banquet, 1892	$400 00	
Headquarters and band	111 00	
		$511 00
Expenses convention, Nov., 1892		231 64
Office rent account		360 00
Salary account, secretary and messenger		760 00
Legal expenses—Drafting bills for California State Legislature and legal advice thereon		428 50
Expense account—Stationery, printing, typewriting, stamps, telegraphing, etc		686 11
Niles Searles' expenses to Washington, representing California Miners' Association. By authority of executive committee		705 20
Expenses of Delegates Julian Sonntag and S. K. Thornton, Trans-Mississippi Congress at Ogden. By authority of executive committee		300 00
	$3 982 45	
Balance cash on hand	88 39	
	$4,070 84	

DELEGATES TO THE CONVENTION.

ALAMEDA.

J. T. Bradley,	W. H. Knight,	J. T. Newsom,
W. F. Blow,	D. McClure,	W. S. Perrine,
F. Chappellet,	M. Mather,	W. R. Schelling,
T. A. Goodwin,	A. J. Merrill,	M. Sexton,
W. E. Hall,	J. J. Merritt,	G. I. Taggart,
J. H. Hobart,	Robert McKillican,	A. G. Wall.

AMADOR.

C. E. Anderson,	D. Gntman,	James Spiers,
D. Baysen,	E. T. Hall,	George O. Schocker,
John Barton,	George Heazleton,	John Tregloan,
Prof. Church,	S. Hoskins,	John F. Davis,
A. B. Call,	John Myles,	D. R. Thanas,
M. Brown,	J. F. Parks,	C. A. Week,
M. Escober,	L. R. Reichling,	E. Writer.
J. V. Ervery,		

BUTTE.

C. C. Belding,	N. A. Harris,	B. M. Mores,
J. C. Boyd,	W. J. Hessiro,	C. J. Nickerson,
Lewis Burwell,	John Heesley,	D. K. Perkins,
L. Cohn,	W. S. Higgins,	E. C Pasdon,
W. E. Duncan Sr.,	L. J. Lewis,	G. W. Price,
W. E. Duncan Jr.,	L. L. Myers,	H. V. Reardon,
A. Ekman,	Frank McLaughlin,	E. W. Slater,
C. P. Farnham,	B. L. McCoy,	Dr. Serviss.

CALAVERAS.

C. Barger,	Willis Dunbar,	S. S. Moser,
D. G. Cameron,	S. Foorman,	G. W. Roberts.
J. Copeland,	C. D. Lane,	

EL DORADO.

J. J. Crawford,	Captain Hawthorne,	J. W. Estes.
E. W. Chapman,	G. W. Cummings,	

NEVADA.

E. K. Ahadie,	L. P. Goldstooe,	W. F. Prisk,
A. Allen,	John Glasson,	J. Pridgeon,
C. J. Brand,	M. M. George,	E. M. Preston,
A. Borrows,	A. Gault,	H. Place,
A. S. Bigelow,	C. Grimes,	A. Ranch,
N. P. Brown,	S. Grayner,	J. J. Rolfe,
J. M. Buffington,	C. Helwig,	J. Robinson,
A. S. Begbie,	J. Hussey,	J. Recton,
James Bennallhack,	C. F. Hegerty,	P. Riley,
W. Cole,	A. Isoard,	A. J. Ridge,
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How to Build Good Roads.

IN TWO PARTS—PART II.

[The following paper on how to build good roads, and what are the best and most economic roads, was written for the late California Road Convention by W. E. McClintock, C. E., of the Massachusetts Highway Commission.]

GRADES OF ROADS.

Many of the older roads of our country were laid out with grades far in excess of what should have been allowed. When the abutting property had been improved to any great extent, these hills cannot be reduced without great cost for damages, in addition to the great outlay for surfacing. In such cases the roadway will have to be improved on practically the old grade. If this should exceed five or six feet to the hundred, the wear from surface water will be great and much difficulty will be experienced in obtaining a road which will quickly divert the water into the side gutters without producing ruts or gulleys. If the natural soil be sandy, it can be covered with a thin layer (from four to six inches thick) of clay or sandy clay, having a crown of about one inch to the foot. On this clay lay a coating of fairly coarse gravel about two inches thick. Under the action of rain and traffic the gravel will be gradually worked into the clay, until a compact, even mixture is had, which will withstand the wash of water very well. Ruts will work ruin to any hill road. Therefore, as the ruts begin to show in a new road they should be filled in by moving the surplus material at the sides into them.

THE BROKEN-STONE ROAD THE BEST.

Unquestionably, the most economical road to build is one made of broken stone, if the stone can be found at a reasonable distance. It is a prevailing belief amongst men with no experience that any kind of stone is suited to road building, and that it may be applied in any manner.

The same custom prevailed before Macadam's time; and then, as well as now, there were many failures from this cause, and an immense waste of money.

If we recall what has already been said about the roadway constituting a roof over the foundation, we can readily see that large stones thrown at random into a wet soil will not lie close together; the mud in which they rest will be pressed upward by the weight of the superincumbent material until the stones cease to be of value on account of the mass of mud on top.

TOP AND BOTTOM STONE.

On the other hand, if the stones at the bottom be large and carefully laid to practically cover the ground, leaving only small spaces, and if these spaces be filled as far as possible by smaller stones, then a pavement is provided through which the mud cannot press upward, and the stones will remain where they are first placed, while the road will be good and durable. These large stones will afford not only a good foundation, but the small interspaces will act as an underdrain to the roadway. It is to be borne in mind that under such conditions free outlet must be furnished, or the result will be the reverse of what was expected, as the water will stand about the stone and soften the ground so as to render it unfit for a foundation. Over the top of a foundation so prepared may be laid either gravel, as before described, or broken stone. If broken stone is to be used, it should be laid on in layers, with fragments of nearly equal sizes, the larger bits on the bottom and the smaller ones on top.

THE SUBSTRUCTURE STONE.

What is usually used for such purposes is stone at the bottom, which has passed through a 2½-inch screen and not through a one-inch. On this is placed a layer which has passed through a one-inch screen and not through a quarter or three-eighths-inch screen. The whole surface is then covered by a layer of fine screenings about one inch thick, which have passed through a quarter or three-eighths-inch screen. This stone should be thoroughly compacted by a heavy roller, each layer by itself, before the next layer is spread on. The dust would better be watered as well as rolled, so as to insure its being worked in to fill all the interspaces in the larger stone. The fragments of stone should be brought as close together as their shapes will permit.

A STONE ROADWAY.

When this is done the bulk of the roadway will be of stone, while but a small amount of dust or "binder" will need to be used. A road built in this manner will shed water and at the same time bear up a loaded wagon without being rutted or wearing uneven. The small stone on top will be slowly crushed beneath the wheels of passing wagons and furnish a constant supply of fresh binding material for the larger fragments beneath, thus preventing their being kicked out.

To recapitulate: First make a firm bed; lay the stone on this in nearly equal sized fragments; roll each layer, and use stone dust or good gravel for a binder, with water enough to wash the dust into the voids. Don't use any clay or loam with the stone, as either material absorbs water and destroys the bond of the stone, while it also makes dust in dry weather and mud in wet. Its use may give apparently quicker results, but it will prove a sure element of destruction. On sandy or gravely soil there need not be any large stone at the bottom, nor so much depth of any kind of stone. The smaller broken stone may be laid directly on such material to a depth of four or six inches with excellent results. The depth will depend on the expected volume of traffic over the proposed roadway.

WIDTH OF ROADS—MACADAM.

The width of a road should be regulated by the traffic. Fifteen or sixteen feet of finished way is usually sufficient for a country road, which may be increased through villages to 20 or 25 feet, finishing outside of the gravel or stone with the natural soil.

In selecting stone for a macadam road, that which is hard and tough is the best. Trap work meets all the requirements better than any other. There are several kinds of hornblendic granite which give good results. Some of the conglomerates, amygdaloids and felsites are suitable. None of the slates, schists or sandstones are of any special value; they are too soft and are soon converted into mud. The micaceous granites make but poor road material. The poorest of these, however, are far better than mud, and can be used if no better are available.

It may often be profitable to have a geologist look over the ground if no good material appears in sight. In our own experience we have known of towns using an inferior rock when a first-class one could just as easily be had, if the road officers had only known where to find it.

We have attempted to outline a few general principles which should guide one in building roads.

SELECTION OF MEN TO BUILD ROADS.

There still remains a very important point which we have not touched on, and that is the selection of men who shall have charge of such work. If we wish the services of a doctor or lawyer, we select that man whose training and experience have been such as will give us confidence in his judgment. We should not think of going to a doctor to build us a house or a lawyer to instruct us in caring for our farm. Neither should we call in the lawyer, the doctor or the farmer to build and take care of our roads. There is no more sense in one proposition than in the other. The art of road-building is one that can only be attained by experience. A man who is to be intrusted with such work should be honest and firm, capable of handling men and teams; and in addition to this, he should be instructed in road work and made familiar with methods. Most towns think they are too poor to afford instructions of this kind to the road officers, but such economy is of the kind "which saveth at the spigot while wasting at the bung."

WASTING MONEY.

As a rule, most of the road money is wasted in a vain attempt to do too much, and in building without any knowledge of methods or materials.

The older countries of Europe passed through just such an epoch as we are now passing through, and came out into the light nearly a hundred years ago. Nothing was done of any value until the old system was abandoned and a new one adopted. The old system was like our present one; the new system placed trained men in charge of the highways, and as a result it is the exception to find poor roads while the money outlay has been in many cases far less.

INSTRUCT THE BUILDERS.

We may select the best available local men to supervise our road-building, provided we furnish suitable men to instruct and guide them. A careful study of the whole subject seems to indicate that such instruction may be obtained through a State commission with advisory powers.

Letter from South Africa.

In May last C. C. Perkins, who built the Tacoma smelter, left for the gold fields in South Africa, fully determined at the age of 68 to recover his lost fortunes in a foreign land. How well he is pleased with the country is explained in a private letter received from him by a friend in Seattle. The letter bears date Johannesburg, in South Africa Republic, August 9, 1893. He says:

"I have been here seven weeks and am in love with the country, which is blessed with a climate similar to that of southern California, with the difference that it is not quite so warm and the nights are somewhat cooler. It is organized under a republican form of government, progressive and prosperous. The chief city is Johannesburg, with a population of about 40,000.

"Regarding the mines, the mineral is formed in reefs or ledges, as we call them, and these ledges are about forty miles long on level ground, over which a carriage can easily be driven from one end to the other. There are three distinct reefs, in reality, the main one of which is from six to ten feet in width, and pays from four to seven pennyweights to the ton. The north reef is from two to three feet wide, paying sixteen pennyweights, while the south reef is only from ten to twelve inches and pays from two to four ounces of gold to the ton. They save about 60 per cent on the plates, while the sulphurets are taken out and put through chlorination works, then the cyanide process is used on the tailings. Ninety-two per cent of the assay value of the ore is thus saved.

"The formation is a sedimentary sandstone, formed on a level, then tilted to an angle of thirty to forty degrees. The reefs are conglomerate, not quartz, and crushes very easily. At Boeherton and other places there are ledges of quartz like those in America, but they are pockety.

"The mines are worked principally by Kaffirs, who are paid 75 cents a day. White men boss or superintend these cheap African laborers.

"There are 3000 stamps running successfully on this ore, while more mills are being constructed. I have no definite information as to the output of these mines, but should judge it was very large.

"This country suits me better than America, and I shall stay with it."

The Noble Ruling.

TO THE EDITOR:—In the PRESS of Sept. 23d Mr. John Dare Emersley dares to criticise a ruling of our ex-Secretary of the Interior John W. Noble for canceling the patent of J. F. Bigelow to two mining claims in Marysville district.

I have mislaid my PRESS of Jan. 14th and am not able to refer to it; but, if my memory serves me right, our friend Emersley did not fully digest the decision of Secretary Noble. My understanding of the ruling was, and still is, that two locations, of 1500 feet each, had been made from one discovery shaft, the end line of each claim running through the center of the one discovery shaft. If I am correct in my understanding of the ruling, this is certainly good law as well as justice; for, if this were allowed, all mining locations could be made 3000 feet in length.

As Mr. Emersley says, "our mining law is liberal to the prospector;" but he does not say, what is also very true, that very few prospectors are satisfied with the liberality of the mining laws. They are too greedy for their own good. The labor they expend upon their several locations, if concentrated upon one in good development work, would often give them a fortune; while the work as usually done by scratching the surface and locating many new claims keeps them poor and open to the charge of defrauding the Government, that is so liberal in its mining laws, by holding numerous claims without having performed the necessary assessment work. There is often cause, also, for "jumping" the rulings of our Washington officials, and the writer is not exempt from fault-finding, but in the above instance we think the fault lay with the locator.

B. M. NEWCOMB.

Oat Hill, Napa Co., Cal., Sept. 27, 1893.

Highest Mountain in North America.

The much vexed and much disputed question of the loftiest mountain on the North American continent has at last been settled. John Partridge, secretary of the Geographical Society of the Pacific, has received a letter from the chief of the United States Coast and Geodetic Survey, Washington, D. C., stating that Mt. Orizaba, in Mexico, is the highest.

Mt. St. Elias, Alaska, has for many years past been considered the highest, but Orizaba has been proved to be the higher by 299 feet. The exact figures, as forwarded to Secretary Partridge, are: Mt. Orizaba, 18,314 feet; Mt. St. Elias, 18,015. "These figures," said Assistant Secretary Trenor, "are authentic; and doubtless it will interest every one to know that the question has been settled by so undoubted an authority."

A PROSPECTOR named Taylor, of Idaho, thinks he has solved the flour-gold problem, so vexatious to placer miners. He has invented an appliance, consisting chiefly of a sluice-box, in the bottom of which is a row of overlapping boards. These boards, prior to being placed in the sluice, are smeared with white lead and then sprinkled with sand. Over this surface the water runs in a slow stream. The gravel reaches the sluice through a grizzly. The gold and sand settle to the bottom and are caught on the sanded boards. After the sand and gold has accumulated it is taken up and amalgamated in a quicksilver batch. This device, it is said, can be worked at a cost of about $10 per day, and, while not perfect, it is credited with the best work yet done on the Snake river placers, where the amount of flour gold is very large. It is said that Taylor's machine has been in use all summer and cleaned up from $30 to $50 per day.

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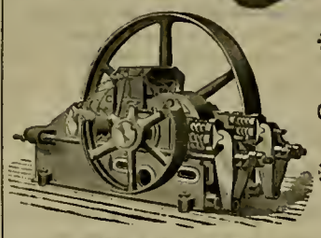

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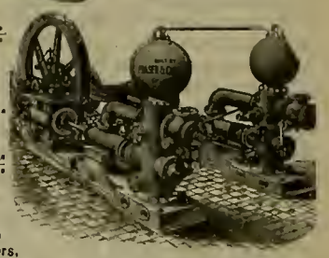

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Mechanical Progress.

New Railroad Signal.

A new automatic safety appliance now in use on an Eastern road is thus described: The transmitting power is compressed air at about 15 pounds pressure, and the mechanism in the hands of the towerman is a single lever, requiring a force of ten pounds to throw it. When this lever is upright, the distance semaphores at 1000 feet and the home ones at 500 are at danger in all four directions, and a double-jointed shoe is raised six inches in the center of the track opposite the home semaphore. If the engineer passes the home semiphore when at danger, this shoe strikes a lever hinged to the forward truck-frame of the locomotive, which in turn opens a cock in the air pipe, setting the brakes on the train. A hundred feet inside the home signal is a derailing point, which the locomotive would take if, by any failure of the air brakes, it reached that place. By throwing the lever in the tower to the right the air-brake shoe and semaphores fell and the derailing point closed on one line, but on the other remained as they were. The train on the open line advanced a few feet beyond the home signal, when the tread of the wheels pressed down a detector bar on the outside of the rail, which, through pneumatic pressure, locked the mechanism in the tower, so that while the signalman could bring his lever back to the upright position, thus setting the danger signals behind the train to prevent a rear-end collision, he could move it no farther, and it was absolutely impossible to open the other road to a train until after the one to which the crossing had been given had been cleared.

The air is conveyed in pipes, and there is a small cylinder, with plunger and piston, at each point where its force is to be exerted. The strong feature of this system is that when one road is closed the other is absolutely and effectually closed mechanically, and beyond the efforts of an excited or careless towerman to open it. The system is applicable to the approach of drawbridges and to the "blocking" of roads, in the latter case the train mechanically raising the danger signal behind it, which would be mechanically released only when the train had left the block; also to the working of switches. The interlocking feature appears to be positive.

Metal for Shot.

The metal for making shot has to be very carefully prepared. Tin is commonly found as an alloy of lead, but if there is so little as one pound of tin in six tons of lead the material will not produce shot; it will only yield oblong slugs. Pure lead will not make shot. It must have with it a proportion of arsenic. The latter has somewhat the same effect upon lead as lard or butter has on pastry; it makes it brittle, says the Washington *Star*.

To begin with, the metal is put into a pot with 30 pounds of arsenic to each ton of lead. The mixture is heated to a cherry red, which signifies about 2000 degrees Fahrenheit. The alloy thus prepared is made into pigs of 100 pounds each. One of these pigs is melted together with 1000 pounds of pure lead, and thus is obtained the material required for the shot. Not long ago a sensation was made in the newspapers by writers who asserted that game killed with shot that were loaded with arsenic must be poisonous. Of course nothing could be more absurd. The effect of this mineral on the metal is to cause the latter when melted to form itself naturally into globules, like quicksilver. When the man at the furnace wishes to ascertain whether his molten stuff is heated to the right temperature, he throws a little of it upon cool iron. If correct it splits into a lot of rolling globules resembling mercury. All being in readiness he skims off from the top of the melting pot a quantity of the impure stuff that floats on the surface. He puts a layer of this in the bottom of one of the saucepans. When partly cool it is of putty-like consistency. It is very porous.

Now the operator holds the saucepan over the central shaft, which is boxed in with planks all the way to the bottom of the tower. Looking down, one can see a faint shimmer of water in the well far below. The workman with his ladle pours some of the pure lead alloy into the pan. It makes its way through the porous stuff to the bottom of the utensil and forms a little drop at every opening in the perforated bottom.

The drops fall down the well, followed by others as fast as they can form. Being liquid drops, they are absolutely spherical when they leave the saucepan. The man keeps on adding melted lead with his ladle as fast as it is required, so that the shower of metal drops is continuous. By the time they have fallen 100 feet or more through the air they have cooled and hardened so far that the impact of the water does not alter their shape.

Gas versus Oil.

The superiority of gas lighting over the ordinary oil lamps in general use upon Indian railways was strikingly illustrated recently, says *Indian Engineering*, when a special train started from Howrah and ran to Seoraphuli and back in order to give the agent and some of the officials of the East Indian railway an opportunity of contrasting the two methods. The experimental train consisted of a first-class carriage and a guard's van, lighted with Pintsch's compressed oil gas. The illuminating power of the gas was, at a rough guess, tenfold that of the oil lamps, and the difference has only to be seen to be appreciated. In order to test the steadiness of the gas flame the fastest possible speed was ordered, and, despite the oscillation of the carriages, the gas lamps never flickered or wavered in the slightest degree. The pressure in the gas reservoirs, which at starting stands at six atmospheres, was hardly affected in this short run, the reduction not exceeding three pounds to the square inch. The smallest newspaper type could be read with ease in the gas-lighted carriages. In every respect the trip was highly successful.

A Great Railway Bridge.

German engineers are constructing a railway bridge which they hope to be able within the next two years to point to as one of the greatest triumphs of the age. It is located on the Solingen-Remscheld railway, where it crosses a deep valley which will be bridged over by an iron viaduct 1640 feet long and 351 feet high. A span 558 feet long, with a gigantic elliptical arch, forms the bridge proper, and at each side there are a number of strong pillars which are connected with one another by ironwork. All of the ironwork together will weigh 4100 tons. The end supports, each of which is arched to form a passage for a road, and the single supports, all of which are founded on solid rock, comprise 13,080 cubic yards of masonry. The work has been begun, but will not be completed for two years. The preparatory work is very extensive. It will be necessary to first build a temporary bridge 98 feet high. The material will be transported by means of a wire-rope road, and the separate parts will be raised by means of hoisting apparatus operated by electricity.

Mild Steel vs. Iron in Naval Construction.

Owners of steamers built of mild steel are beginning to find out that when subjected to heat and the action of acids it deteriorates much more rapidly than iron, observes the *Nautical Magazine*. In some cases the inner plating of the double bottom in the range of the engine-room has corroded through in a very short time. To meet this difficulty in a number of new vessels, in the part most likely to be affected, iron has been used. There are in addition to the inner plating of the double bottom, the frames and the reverse frames in the coal bunkers. In a large cargo steamer now building, the difficulty has been met by a large increase of the thickness of the inner-bottom plating. Not only has the reduction allowed for the use of steel instead of iron not been taken advantage of, but the plating has been made much thicker than it would be required if of iron.

Disposition of Steamship Ashes.

The method of raising ashes and cinders from the boiler-room of the great ocean steamships by means of a rope and tackle and baskets is rapidly being superseded by the novel system of Mr. See, an English engineer. The apparatus consists of a hopper placed in the fire-room, from which a discharge pipe extends upward below the main deck. The hopper into which the ashes are shovelled is placed a little above the boiler-room floor. At the bottom of the hopper is the ejector with its connection from the pump and its discharge leading upward and outward to the side of the vessel above the water-line.

The ashes, after being thrown into the hopper, encounter a jet of water from the pump and are forced up the discharge pipe quite clear of the vessel, from which the refuse will be discharged as fast as it can be shovelled into the hoppers. This discharge has been applied to the cruiser New York, the chief engineer reporting that "its construction is simple, and consists of few parts; occupies less space than other methods; a less number of men are required to work it; all dirt and noise are confined to the fire-room, and when at sea can be operated at any time, and without interfering with other parts of the ship."—Exchange.

Seamless Steel Pipes.

A Dusseldorf mechanic has invented a method of making steel tubes by punching the pipes from hot metal. This method gives, it is said, promises of success in the manufacture of seamless tubes of moderate lengths. The process consists in placing a bar of steel of square cross section in a matrix of a sufficient strength, having a hole of the exact diameter of the outside of the tube. Then, without giving time for the steel to cool, a mandrel, having a rounded end is forced lengthwise into the mass. It is said that tubes nearly eight inches in diameter have been made by this process, the pressure needed to operate the mandrel being 180 tons. The end of the heated bar furthest from the mandrel is first made to abut against a strong and heavy slide. When the rounded nose of the mandrel has nearly passed through the bar, this slide is moved transversely so as to bring a hole in line with the advancing mandrel, which, continuing to move, punches its way through. Its protruding end is then seized by tongues, and entirely withdrawn.

The operations as described, complete only the first stage of the process. The bar with its perforation is now finished by drawing and redrawing until the required thickness of the shell is reached.

A Remarkable Dam.

One of the most remarkable dams in the world for height and construction is that by which the Vyrnwy river, northern Wales, is enabled to supply water to the city of Liverpool, some 70 miles distant. In building this dam a great trench was first excavated across the valley for a length of 1100 feet, a width of 120 and a maximum depth of 60. The masonry was started in this trench; it consists of immense irregular blocks of slate, wedged together and thoroughly bedded in Portland cement mortar, the faces being formed of cut-stone blocks, fitted together with great care, the greatest height of the dam being 161 feet.

Its most remarkable feature is the lack of any channel to carry off floods, the surplus in the lake flowing down the front of the dam, which is curved to permit as free a descent as possible and prevent the formation of eddies at the bottom. The lake formed by this dam covers an area 4¾ miles long, from one-quarter to five-eigths of a mile wide and holds largely over 12,000,000 gallons. The aqueduct leading from the intake tower to the distributing reservoir, about two miles from the city, is 68 miles long, and consists principally of a large cast-iron pipe line from 39 to 42 inches in diameter. There are a number of reservoirs and tanks along the lines, and at one place is a great filtering plant.

Scientific Progress.

Characteristics of Meteorites.

Recently an account of a meteorite which fell near Beaver Creek, Washington, was printed. It was reported as bursting with several sharp reports in quick succession, the first explosion being the loudest. The noise was heard 25 miles away, and was mistaken for thunder or a blast of dynamite. Following the reports was a whizzing sound. Several fragments of the missile from the sky were picked up.

"It is a mistake to suppose that meteorites burst, in the proper sense of the word," said a scientist to a Washington reporter. "But it often happens that they are broken to pieces on striking the atmosphere of the earth. This may seem surprising, but let me call your attention to an analogy. Strike the surface of water with your fist, and, though a fluid, the resistance it opposes to the blow seems almost as strong as if it were a solid. Now, the meteorite is moving at a tremendous rate of speed. If small, it is set on fire in an instant by the friction of the air, and, after glowing for a moment brightly, is consumed.

"On any night in summer you will see 'shooting stars' now and then. They are meteorites, which, on coming into contact with the earth's atmosphere, are set afire. This is not surprising, inasmuch as they approach the planet on which we live at a speed which often attains 44 miles a second. By causing the destruction of meteorites the atmosphere serves as a protection for people on the globe, who would otherwise be pelted by such missiles to a dangerous extent. It is estimated that not less than 10,000,000 of them, big enough to be visible to the naked eye, strike the earth every 24 hours.

"It is believed by most astronomers that some very large meteors have entered our atmosphere and have passed out into space again, their great momentum being sufficient to take them away from the earth's attraction. What these flying bodies are is a question that has been much disputed, but it is considered most likely that they are the debris of broken-up comets. In one recent instance the correctness of this theory has found striking proof. That was the case of the comet Biela. It was discovered in 1826, and was again observed in 1832, 1845 and 1852. In 1845 it had split into two parts, and in 1872 it failed to appear when and where it should have done. Evidently it had been smashed up, and prediction was made that there would be a great meteoric shower composed of the remains of the lost comet. This prediction was fulfilled.

"Certain groups of meteors move in elliptical orbits around the sun. Occasionally the earth passes through their clusters, producing what are known as meteoric showers. Such showers occur annually from the 9th to the 12th of August, and there is a similar display in November once every thirty-three years. The stream of the August meteors

is estimated to he from 5,000,000 to 10,000,000 miles thick. The earth, though traveling with a velocity of 2,000,000 miles a day, is immersed in it for several days.

"The fall of meteorites to the earth is sometimes accompanied by a great display of light, occasionally illuminating an area of many thousand square miles, when such an event occurs at night, and hy loud detonations, so great in some instances as to shake houses and frighten men and animals. The explosions are caused by the breaking up of the meteor. Ordinarily you will find that such meteoric bodies are coated on the outside with a black substance, which is the effect merely of fusion of the superficial material by great heat. A piece of Biela's comet was actually picked up in Mexico in 1872, at the time of the shower of its remains. Naturally it is considered very interesting.

"Such great interest is taken in meteorites that all of those collected have been carefully catalogued. They are mostly composed of iron, with usually a percentage of nickel and cobalt, and sometimes copper and tin. It is customary to saw them into slices, which is a very laborious process, for sale or for exchange among museums. Sometimes the slices are prettily polished, or the cut surfaces are etched with acid so as to expose the crystalline structure. This structure is in no two such bodies exactly the same, and the differences are thought well worth studying. Attempts have been made to counterfeit meteorites, because they are so valuable, but without success."

Scientific Research Work in America.

I think it quite necessary to point out some of the difficulties encountered in successfully undertaking any scientific research work in America, says Albert Schneider in *Science*. In the first place we, as a nation, are too practical and short-sighted to make thorough scientists. We are too much engrossed with the present to undertake anything which promises only a probable reward in the distant future. In the second place, we lack sufficient scientific training. Boast as we will, we must admit that Germany, France, England, and even Russia, are a long way in the lead in scholarship. From this lack of training we must content ourselves with going over the ground already gone over hy European scholars. Nor is this because of our "infantile" condition. There is no plausible reason why the American mind should not he as ready of comprehension and understanding as any other. We have incipient philosophers who might become equal to or superior to any in the world. The great trouble is that they imagine themselves superior while they are yet in the embryo stage, and as a natural result become fossilized embryos. This is not always the case, hut it is true in the majority of cases. Another great drawback is the uncertainty of holding a position when once taken. This deadens interest and absolutely prevents the possibility of undertaking any work which must of necessity be long continued. In Germany the professor is almost certain of holding his position a lifetime if he so desires. As far as his position is concerned he is almost an absolute monarch. The nature of his work is never inquired into hy the laity. He is given a position because it is known from his preparation and training that he is fully competent. This enables him to begin a work which may require generations for its completion. Lastly the management and directorship of scientific laboratories and experiment stations is too often placed in the hands of men wholly incompetent, considered from a scholarly standpoint. They cannot comprehend the nature of scientific research work nor understand the benefits that might be realized therefrom.

These, in brief, are some of the main difficulties which beset our scientific research work. It is not my purpose to belittle intentionally the work we do or have done. Nor do I believe the prospects for the future to he gloomy and hopeless. America is destined (in time) to lead the world in science and all other branches of learning.

New Uses for the Microscope.

The future of the microscope is as promising as that of any optical instrument, says the *Optician*. New uses are found for it constantly, and in the not very distant future we may find it an article of necessity in every household. When we reflect, it is surprising what a multiplicity of disease might be avoided were the microscope to be installed in our homes and microscopy made an essential branch of our education. The Germans are far in advance of us in this direction. In Berlin, and, we believe, in other important centers of Germany, all animals intended for human consumption. must he killed at the municipal slaughterhouse. There is a heavy penalty for any breach of this law. Not only is every animal subjected to a careful scientific investigation, hut specimens of its blood and tissues are examined under powerful microscopes. In Berlin 45 lady microscopists, who have been thoroughly trained for the work, are constantly employed in these examinations. We strongly recommend this system to the authorities, and we would advise opticians to point out to their customers, verhally or hy pamphlet, the great assistance that even a superficial knowledge of microscopy may be in the avoidance of the ills that flesh is heir to, either inherently or by contagion or infection.

Disease Through the Skin.

Can the bacilli of infections diseases find entrance through the skin? asks an English doctor, who adds: "I do not see that this is at all impossible, as the skin is to a considerable extent absorbent. That we catch diseases most frequently through the delicate mucous membrane of the lungs goes without saying, hut that is no reason why perfect and daily ablution of the skin should not be the motto of every one who wants to keep well and free from danger. The matutinal tub, therefore, should he an institution in every family, quite as much as is the toothbrush. Cleanliness is next to godliness, and if King Cholera came to these shores, I think he would very likely pass over those who were sprinkled. By the way, I noticed the other day that a well-known London journal was calling attention to a new and simple plan of disinfecting rooms. Why, it is quite an old plan. Put a saucerful of salt in the middle of a room and pour on it a dram or two of sulphuric acid. The fumes that arise do the work of disinfection.

Enormous Heat of the Sun.

It has been calculated that the heat given off by the sun in a second of time would melt a pillar of ice 1590 square miles at its base and 194,626 miles in height. If this heat is produced hy fuel added from outside of the sun, there must he added every second of time a quantity of fuel capable of melting this enormous quantity of ice, and this would require a quantity of coal of almost equal mass. If iron, copper or stones were added, we cannot conceive how this would generate heat, for, if added to terrestrial fires, they absorb heat instead of producing it. Meteors are of this nature, containing a large percentage of iron, and being composed of what we would term non-combustible materials.

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The Antiquity of the Telephone.

It is a pretty widely known fact that as early as 1667 the English physicist, Robert Hooke, described the transmission of sound to a very considerable distance. He says that by the help of a tightly drawn wire, which even might be bent in many angles, sound might be propagated to a long distance and with a rapidity which, though inferior to that of light, was, at any rate, infinitely superior to that of sound in the open air.

It is a most curious fact, and one which is not so generally known, that Jacob Cristoph von Grimmelshausen, a German author of the seventeenth century, in the first chapter of the third book of his celebrated novel, "Simplicius Simplicissimus," mentions an instrument which, according to his description, not only corresponds to Robert Hooke's apparatus, but leads to the assumption of the existence of a contrivance at the time of the Thirty Years' War, very similar to our present telephone, says *Electricity*. The passage from the book reads literally as follows: "I was, as already mentioned, so eager to gain honor and renown, that I could not sleep while all this was passing through my head. And when I had such fancies, and lay awake many a night thinking how I might contrive new finds and stratagems, I had very curious notions; consequently, I bethought myself of an instrument with which I could on a calm night hear a trumpet being blown at three hours' distance, and a horse neighing and a dog barking at two hours, and a man talking at one hour's distance. In the daytime the instrument was not so useful to me, unless it were in a quiet place, because one would have heard the horses and the cattle, down to the least bird in the air, or frog in the water, all together, so that one would not have understood one in consequence of the noise of the other. Now, I know quite well that there are people at this very hour who do not believe me, but whether they believe me or not, it is the truth. I undertake, by means of an instrument invented by me, to recognize at night by his voice a man who does not speak louder than is his usual custom. And no one would believe me of those who saw with their own eyes how I used the aforesaid instrument, and when I said to them, 'I hear horsemen galloping, for the horses are shod,' or 'I hear peasants, for the horses go barefooted;' then 'there goes a herd of cattle, for I hear sheep bleating, bulls bellowing and pigs grunting, and so forth.' My own comrades at first took these speeches for 'fibs,' but when they found in reality that I was always speaking the truth, then they called it witchcraft taught me secretly by the devil's own mother. I am of opinion that if I had taught this science openly I should have become very popular, because it would have proved of great advantage to those engaged in war, especially in sieges." This is what Grimmelshausen says about his "far-hearing instrument," to which must be accredited a certain resemblance with the present telephone.

Electric Signals Without Wires.

A very interesting experiment has been made by Mr. W. H. Preece on the transmission of electric signals through space without wires. A heavy copper conductor was suspended on poles for a distance of 1267 yards along the shore of the Bristol channel, says the *Engineering Magazine*. On an island 3.1 miles distant a gutta-percha-covered wire 600 yards in length was laid. Through the shore circuit an alternating current of 150 volts and a maximum strength of 16 amperes was transmitted, which could be broken up into signals in the usual way by means of a Morse key. Telephones in the secondary line were used for receiving instruments. No difficulty was experienced in reading the signals at this distance, but, when tried with a wire laid on another island at a distance of 5.35 miles, though signals could be perceived, intelligible communication was found to be impossible. Mr. Preece finds it essential, to insure good results, that the secondary wire should be of a length at least equal to the distance between it and the primary wire. The system, therefore, fails to provide for the cases of isolated lighthouses and lightships, where such a means of communication, if practicable, might often prove of the greatest value. Experiments are now in progress to determine whether this principle is available for indicating the approach of a vessel to lighthouses and landfalls, but no results have as yet been made public.

Freak of Electricity.

The peculiar action of the electric current is sometimes very interesting, as well as amusing. A Portland, Or., paper tells that Mrs. M. E. Thompson, who resides on Williams avenue, Upper Albina, went into her yard the other day to gather some plums. The first one she touched gave her an electric shock. Again she tried to gather the plums, and every time she touched one she received a strong shock.

Unable to account for the occurrence, she called in a neighbor, and she went through the same experience, and not a plum could they get. Mr. Menefee was called, and he started toward the place where the ladies were standing, and came in contact with a clothesline full of clothes. In attempting to separate the clothes, so he could pass, his hands came in contact with the line, and he received a shock that knocked him down. This led to investigation, made with great caution, and it was discovered that the electric-light wire connected with the house was broken and had fallen across the clothesline, one end of which was attached to the plum tree. The line and clothes were damp and formed a good conductor. Also, when a plum was touched, a circuit was completed and a shock received.

Electrical Magic.

In his autobiography the late Sir W. Siemens relates an amusing anecdote. An Arab called his attention to the fact that when at the top of the Pyramid of Cheops when he raised his hand with fingers outspread, an acute singing note was heard, the sound ceasing as soon as he let his hand fall. "I found his assertion," he writes, "to be true. As soon as I raised one of my own fingers above my head I felt a prickling in my fingers. That this could only be caused by an electrical phenomenon was proved by the slight electric shock felt on trying to drink out of a wine bottle. So I wrapped a full bottle of wine that I had with me in damp paper, and thus converted it into a Leyden bottle, which was soon strongly charged with electricity by the simple device of holding it high above my head. The Arabs had already become distrustful on seeing small lightnings, as it were, issue from the wine bottles held up by myself and companions, and now held a brief consultation.

"Suddenly, at a given signal, each of my companions were seized by the guide who led him up, who now tried to force him to go down again. I myself was standing at the very top of the pyramid when the sheikh of the Arabs came to me and told me, through my interpreter, that the Arabs had determined that we were at once to leave the pyramid, because we were practicing magic, and it might damage their chance of earning a living. On my refusing to obey orders, the sheikh caught hold of my left hand.

"I had awaited this moment, and held my right hand with the bottle in the attitude of a magician, afterward lowering it slowly toward the point of the sheikh's nose. When quite close to the feature I felt a violent shock run through the bottle to my own arm, and was certain that the sheikh must have received the equivalent. At any rate he fell speechless on the stones, and a few anxious moments passed before he rose suddenly with a loud cry, and sprang down the gigantic steps of the pyramid with long strides. The Arabs, seeing this, and excited by the sheikh's constant cries of 'Magic! magic!' released my companions, and followed their leader, leaving us complete masters of the pyramid."

Illuminating Powers of Paraffins and Olefines.

It is a remarkable fact, and one of some importance in gas-making, that the gases of the paraffin series are of much lower illuminating power than those of the olefine series, says an exchange. For example, ethane, the second member of the paraffin or saturated series, has an illuminating value of some 34 or 35 candles, while ethylene, the corresponding member of the unsaturated group, has an illuminating power of some 68 or 70 candle power. As the Russian oils are composed chiefly of the olefines, the unsaturated hydro-carbons, it is probable that this oil would be better fitted for use in enriching water gas for illumination than the American crude, which is composed almost exclusively of paraffins. It is stated by Dr. Vivian Lewis, however, that ethane can be readily converted into ethylene by heating it. This explains why more light can at times be got out of an oil by converting it into gas. The illuminating power of the paraffin is increased by its conversion into an olefine. Dr. Lewis also states that the cracking of the paraffins results in the formation of nearly equal quantities of saturated and unsaturated hydro-carbons, that is of paraffins and olefines.

How to Show Lines of Electric Force.

The following experiment for making visible lines of electric force is described by Herr Brnno Kolbe: Into a flat cylindrical vessel pour purified anhydrous oil of turpentine to a depth of about two cm., and add some sulphate of quinine. To the rim of the vessel attach two wire springs, adjusted so that the two small metallic balls at their side dip into the turpentine. Stir the quinine with a glass rod so as to distribute it evenly, place the vessel on a black cardboard. Join the two wires to the terminals of an influence machine, and turn very slowly. At once the white crystals group themselves so as to form beautiful curves, respresenting the "lines of electric force." The form of these curves recalls that of the brush discharge of the influence machine. Prof. Weiler, of Esslingen, gives the following experiment: Prepare a milky mixture by stirring up finely-divided quinine in oil of turpentine. On sending a series of discharges through it, a clearance is produced at the positive pole, and the particles cluster round the negative pole, arranging themselves in streamers directed along the lines of force.

To Control Wind Currents.

An interesting note in a London paper on wind-power says that some years ago an attempt was made, under the auspices of the Duc de Feltre and M. L. Vigreux, to drive the dynamos at the Pointe de la Heve lighthouse by wind-power. The wind, however, as is its custom, blew when and where it listed, and ended one fine, or, rather, one stormy day, by overthrowing the ungainly apparatus installed on the exposed headland. M. Max de Nansouty, in alluding to this attempt to harness the wind, suggests that, next time a similar attempts is made, it would be as well to try the effect of surrounding the "atmospheric turbines" by strong towers, and directing the wind onto the vanes by nozzles in much the same way as the water is directed onto the buckets of a Pelton wheel. This idea of "canalizing" air currents is, it is said, actually engaging the attention of windmill experts.

Fires from Electricity.

Returns for one year from the fire departments of 60 principal cities in the United States, selected from among those having more than 20,000 inhabitants, show that the fires attributed to electricity constitute 1.19 per cent of the aggregate number, and 1.23 per cent of the aggregate losses, says the *Engineering Magazine*. New York City heads the list with 59 fires, followed by Boston with 26. The generator capacity of the electric light and power plants now running in these cities, including central stations, isolated plants and street railways, amounts to more than 200,000,000 watts, which is equivalent to nearly 4,000,000 16-candle power incandescent lamps, or 285,000-horse power.

The Difference.

An Eastern judge in rendering a decision in the first Julien storage-battery case, made a very apt distinction between the primary battery and the storage battery, and one quite comprehensible to the layman. "The two differ," said he, "as a spring differs from a reservoir."

Useful Information.

Modern Explosives.

The composition of some of the modern high explosives, according to *Engineering*, is as follows:

Dynamite — Seventy-five parts of nitro-glycerine and 25 of infusorial earth.

Dualine—Eighty parts nitro-glycerine and 20 of nitro-cellulose or gun cotton.

Rendrock—Forty parts nitro-glycerine, 40 of nitrate of potash or soda, 13 of cellulose and 7 of paraffine.

Giant powder—Thirty-six parts of nitro-glycerine, 48 of nitrate of potash or soda, 8 of sulphur and 8 of resin or charcoal.

Mica powder—Fifty-two parts of nitro-glycerine and 48 of pulverized mica.

Tonite—Fifty-two and one-half parts of gun cotton and 47½ of nitrate of baryta.

Blasting gelatin — Ninety-two parts of nitro-glycerine and 8 of gun cotton.

Atlas powder—Seventy-five parts of nitro-glycerine, 21 of wood fibre, 2 of carbonate of magnesia and 2 of nitrate of soda.

Rackarock — Seventy-seven and seven-tenths parts of chlorate of potash and 23.3 of nitro-benzol.

It will be noticed that nearly all the above explosives are composed principally of nitro-glycerine; and it is probable that in most cases the other ingredients only act as absorbents for this liquid, and really add nothing to the explosive power. The decomposition of nitro-glycerine is practically instantaneous, and the slower-acting nitrates and hydrocarbons must be left far behind when the mass is exploded. The power of all these substances is due to the paradoxical element nitrogen, which is by itself the most neutral and inactive of all the elements, but, when forced into chemical combination, usually confers an element of weakness upon the entire molecule of which it forms a part.

Greatest Cost of Lead Pencils.

"The greatest cost in making first-class lead pencils is not in the wood, even when the smoothest and straightest grained Florida cedar is used, nor in the finishing and stamping of the pencils, though the finest varnish and purest gold are used," says the Joseph Dixon Crucible Company of Jersey City. "The greatest cost is in the time and labor spent in manipulating the materials of which the lead is made. The materials used in making such leads are the finest and smoothest graphite and clay. The graphite

is specially selected for the purpose, and is most carefully floated through water time and again, which allows the grit and coarser particles to sink and become separated. The clay is also subjected to similar thorough and careful treatment. The proportion of clay determines the degree of hardness; and therefore, in order that the leads may be uniform in hardness as well as toughness, long-continued grinding and mixing are necessary, as well as other painstaking operations, before the leads are perfected and ready for the wood and the finishing processes. In cheap pencils, no matter what the finish may be, the leads receive but scant attention."

The Family, Pro and Con.

Family reunions seem to be growing very popular. They have been chronicled by the score in the newspapers this summer, and the increasing frequency of them may, perhaps, be taken as a sign of a growing interest among Americans in family stocks. In Virginia, and more or less generally throughout the South, people have been in the habit of acknowledging their cousins, and keeping some sort of track of them; but it used to be asserted down there that, in the North, blood was not much thicker than water, and that relationship was but a slender tie, to be recognized or ignored as expediency might direct. The North must be improving in that respect, and perhaps it is well that it is. The tendency of American institutions and of the conditions of life in this country for the last century has been to develop individualism to an extreme degree. Families have been systematically scattered. Some members have gone West, others have moved to town, and all have worked out their independent destinies as best they could.]

That is a good way; but there are advantages, too, of people of the same blood touching elbows and keeping one another in sight. A large family connection has its drawbacks, but it has compensations, too. It involves a degree of mutual assistance that may sometimes be inconvenient to the more prosperous members; but it also involves co-operation which may be helpful to all the parties to it, and, by creating new interests in people, it helps to quicken one's interest in life. Life is no fun unless one takes an interest in somebody, and to be interested, not exclusively, but genially, in one's relations is a good plan, and is really no more trouble and costs no more than to be interested in people who are other people's relations. Family reunions, provided they are skillfully engineered and do not happen too often, may be pretty good sport, and people who keep out of them for fear of meeting poor relations whom they do not know are in reasonable danger of losing more than they escape.—Harper's Weekly.

Raw Silk from Abroad.

The value of the raw silk imported into the country annually is given as $25,000,000. This is used in the manufacture of ribbons, fabrics, etc., in four States, one of which is Pennsylvania, which perhaps uses two-fifths of the whole—or to the value of $10,000,000. The value of the silk manufactures of Pennsylvania, as given by Hon. Lorin Blodgett, than whom there is no better authority, is $79,000,000. As 65 to 70 per cent of the cost of manufacture in this industry consists in the wages paid to labor, here we have an illustration of the number of families that are made comfortable by remunerative employment by an industry, the raw material for which comes from the other side of the world.

For What Is Lumber Used?

For what is the greatest amount of lumber used? Nine people out of ten will say for houses and buildings. It is doubtful if 35 per cent of the lumber output goes into buildings. The railroads, farmers and miscellaneous purposes take about 40 per cent, and the other 20 per cent goes into boxes.

Don't Hear Everything.

That was a wise remark by a lady who had brought up a large family: "You have got to overlook some things in a little child. You cannot expect them to be perfect." In the same line are these remarks from a religious paper:

"The art of not hearing should be learned by all. There are so many things which it is painful to hear, very many of which, if heard, will disturb the temper, corrupt simplicity and modesty, detract from contentment and happiness. If a man falls into a violent passion, and calls us all manner of names, at the first sound we should shut our ears and hear no more. If in a quiet voyage of life we find ourselves caught in one of those domestic whirlwinds of scolding, we should shut our ears as a sailor would furl his sail, and, making all tight, scud before the gale. If a hot, restless man begins to inflame our feelings, we should consider what mischief the fiery sparks may do in our magazine below, where our temper is kept, and instantly close the door. If all the petty things said of one by heedless or ill-natured idlers were brought home to him, he would become a mere walking pincushion stuck full of sharp remarks. If we would be happy when among good men, we should open our ears; when among bad men, shut them. It is not worth while to hear what our neighbors say about our children, what our rivals say about our business, our dress or our affairs."—Observer.

Language of the Visiting Card.

The custom of turning down the corners of the cards to signify different messages is not a very general one, as it is considered better form to have one's pasteboard representative as fresh in appearance as possible, writes Mrs. Hamilton Mott in the October *Ladies' Home Journal*. However, the fashion does obtain to a small extent, and its language is as follows: Turning the upper right-hand corner signifies that the single card is to include all the ladies of the household, and turning the upper left-hand corner, that the call was made personally. This latter is the more senseless custom, as except in Washington, where the visiting duties are so very onerous, it is very unusual in this country for ladies to call by proxy or to send their cards to a door by their maid or footman.

Killed by Ice Water.

Cases of death by drinking ice water when one is overheated have been reported. Great care should be taken in regard to this matter. The craving for cold water when the heat is great and a person has been exerting himself is sometimes almost irresistible. But the craving should be but sparingly indulged. In fact, it would be better at such times not to drink very cold water at all. Water of only moderate coolness would be a great deal better. One should exercise the restraints of common prudence in such matters. "Killed by ice water" is a verdict which no coroner's jury should have it in their power to render.—N. Y. Ledger.

Delicious Mixed Pickles.

Let five dozen small cucumbers stand in strong brine for three days, writes Eliza R. Parker in the *Ladies' Home Journal*. Wash through cold water several times. Put half a gallon of strong vinegar in a kettle, with one ounce of mustard seed, one of juniper berries, one of celery seed, half a dozen pods of green peppers, two pounds of sugar, half dozen small onions and a lump of alum. Let come to a boil, and pour over the pickles for three mornings, heating the vinegar each time. Put the pickles in wide-mouthed bottles and seal.

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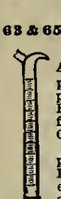

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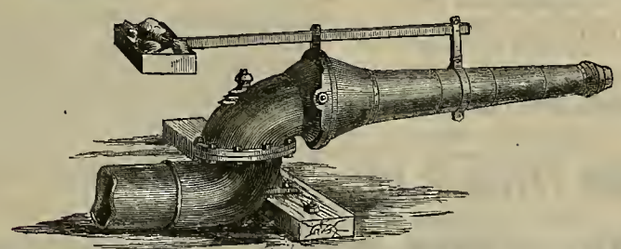

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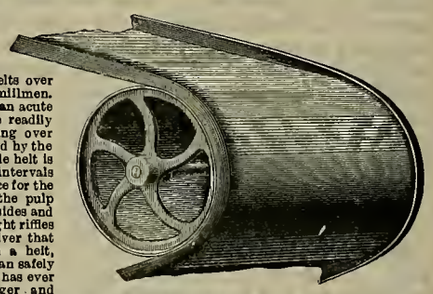

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First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers; thus the vexation and loss caused by the frequent breaking of the flanges of the old style belt is practically done away with. Again, our belts, at intervals of two to four feet, have a very slight riffled surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it from banking on the sides and forming channels through the center. These slight riffles also save very fine sulphurets and the quicksilver that would otherwise escape with the tailings from a belt, the surface of which is entirely smooth. We can safely say that it is a better concentrator belt than has ever been manufactured. It will last much longer and will handle more pulp. We also manufacture smooth belts with same flanges when desired.

H. G. BLASDEL, Jr., Manager, 419 California St., San Francisco.

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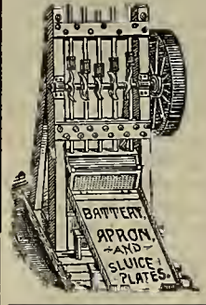

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An Important Decision.

A very important case having direct effect upon mineral lands in odd-nnmhered sections within the railroad grants of this State has been decided hy the United States Court of Appeals in a case from Montana. It is well known that the railroad companies of this State claim title to all mineral lands in odd-numhered sections of Government grants, the mineral character of which was not established at the time of the grant. The railroad company is upheld in this position hy the decision of United States Judge Sawyer, who ruled that the clause in the land grant excepting mlneral lands did not obtain in cases where the mineral was discovered subsequent to the grant. In obtaining title to mineral lands on railroad grants in this State, it has always heen necessary for an applicant for patent to ohtain the railroad company's quit-claim deed, as well as to secure a patent from the United States. In instances the officers of the United States Land Office have refused to proceed witb a mineral application where it covered a parcel of an odd-numbered section within the limits of a railroad grant witbout the issuance of a direct and special summons to the railroad company, or the production of an ahandonment from the railroad company.

The rule has been settled heyond any peradventure hy the decision of the United States Circuit Court of Appeals, in the case of the N. P. R. R. Co. vs. Cannon et al., 54 Fed. Rep., 252, reported to us hy Edward A. Belcher, attorney-at-law of this city.

In that case the railroad company filed a bill in the United States Clrcuit Court for Montana to quiet titie for a parcel of an odd-numbered section of its land grant. The grant to the Northern Pacific Railroad Company, as is the case with all of the land grants to railroad companies on the Pacific coast, excepted "mineral lands." The hill alleged that hy the Federal survey the land in question had been returned as agricultural in character; that the company filed its map of general route February 21, 1872, and its map of definite location July 6, 1882; that on August 28, 1878, the defendants, pretending that the land was valuahle for the precious metals contained within it, made application to the United States Land Office to purchase the land as "mineral land;" that the officers of the Land Department gave the customary notice of said application by pnhlication and posting, and none other; that afterwards such testimony was taken and such proceedings had touching such application and the alleged character of said land as "mineral land" that the officers of the Land Office permitted the defendants to enter and pay for said land as "mineral land," and that afterwards a patent for said land as "mineral land" was issued to the defendants hy the United States; that the company had no actual notice of the patent proceedings, and did not know of such application until long afterwards, and had no opportnnity to make a contest or show the cbaracter of the land.

A demurrer was interposed and entertained, and on appeal the United States Circuit Court of Appeals said:

Appellant [the railroad company] claims that no notice was given personally to it. *The law does not require any such notice to be given.* The notice required by Sectiou 2325 is a general notice to all persons who might from any cause claim any interest in the land. Under Section 2325, Rev. Stat. U. S., provision is made in case of a contest as to the land, whether agricultural or mineral, and if appellant had desired to contest that question it had the opportunity to do so, and, *after initiating a contest, it would have been entitled to personal notice of all the proceedings thereafter taken, and to have participated therein, and offered such proofs as it might have been able to procure as to the character of the land.* Not having initiated any such contest, it is not in a position to complain that it was not personally served with notice of the proceedings. * * * Appellant's claim was *for agricultural land included in the grant.* The defendant's application was *for mineral land excluded from the grant and open to exploration, location and purchase independent of the grant.* When appellant accepted the grant, and at all times thereafter, it knew that the mineral lands were excluded from its grant, and the law charged it witb notice that mining locations and applications for patents might he made and patents obtained therefor hy persons claiming the lands to he mineral. The Government of tbe United States performed its duty to appellant when it provided a mode and a tribunal for determining the character of the land. Under the provisions of the statute we have quoted and referred to *appellant* [the railroad company] *was charged with knowledge of the notice which the mineral applicant was required to give by general application and by the posting of notices upon the claim, and of the notices required to be given by the Land Department,* and having failed to file any contest against the defendants' application, the question thereafter, as to the character of the land, whether mineral or not, became a matter hetween the defendants and the Government of the United States.

So far as known, tbis decision bas not altered the practice of land offices in this State. It is atill necessary to issue a special summons to a railroad company or procure the company's abandonment. The railroad companies are not entitled to any other notice of the application for a mineral patent than the published and posted notice. Further, it would seem to he settled that the company's title to the land is of no value, and need not be purchased.

Reduction Works at Reno.

The new reduction works nnder course of construction at Reno, Nev., are rapidly approacbing completion, and will soon be ready for business. The location is one mile helow Reno, on the Truckee river. The appliances at the works include a dry-crushing ten-stamp battery, amalgamating pans and chlorinating furnace. In addition, a copper-matte smelting furnace is heing constructed. A building 45 by 100 feet is belng erected for this furnace. The stack is 60 feet bigb. The furnace is a water-jacket with a capacity of from 50 to 60 tons a day. Gold, silver, copper and lead ores or ores containing sufficient of any or all of these metals will he snccessfully treated. There are on band now sulphnrets from Esmeralda, gold ores from Kennedy, and silver ores from Oreana in Hnmboldt county, antimonial silver from the Cottonwood mines in northern Washoe, free-milling silver ores from the Corliss mine in Peavine, ten miles from Reno, and, in short, ores in greater or less qnantities from nearly every district in northern Nevada.

H. H. Beck is general manager of tbe works and R. D. Clark superintendent and metallurgist. Mr. Clark is a practical smelter and millman who has had many years experience and thoronghly understands the husiness. The company pay cash for all kinds of ores that contain sufficient gold, silver, copper or lead to pay for handling them. The Central Pacific Railroad transports ores from all stations on the line at the rate of one cent per ton per mile.

To Revive the Comstock.

James G. Rule, a veteran miner, who was superintendent of the Consolidated California and Virginia Mining Company in 1884–5, when John P. Jones had a lease of the npper levels of that mine, has made a proposition to the managers of the company that has attracted mnch interest. Mr. Rnle says he knows of the existence of a large body of good ore ahove the 1100 level of the old Consolidated Virginia ground. He believes tbat this body of ore, if developed, will add many millions to the bullion outpnt of the property and enable it to be again put on a paying basis. He claims to have discovered the existence of this body of ore while directing tbe work done by Senator Jones. He asks for six months and a considerable expenditure of the company's funds for the prosecntion of the work, and asks for no compensation if the ore be not uncovered within three months.

The managers of the company are inclined to look favorably upon the proposition, as they see in it a possible chance of reviving the property. Mr. Rnle has made similar propositions in the past, and those in charge thonght it advisable to continue the work of prospecting according to the plans of those in charge. As this last has developed nothing of any value, and as the company has a certain amonnt of money that may be utilized in making further prospects, it is felt that Mr. Rule's plan should he adopted.

The meeting of the stockholders of the Consolidated California and Virginia mine will be held on Monday, Oct. 16th, when action will be taken regarding tbe proposition made by Mr. Rule.

Coast Industrial Notes.

—The well-known ranching firm of Smith & Ballaine at Tekoa, Wash., assigned, with assets of $20,000 and liahilities of $30,000, to T. J. Person of Endlcott.

—The employes in the shops at Wadsworth, Nev., have heen put on full time again. For some time past they, as well as the shop employes on the entire system, had been working only 32 hours a week to prevent a reduction in dividends of the railroad company.

—It is now proposed to re-establish rates of dockage and wharfage at the Oakland city wharf, so that all passenger and freight ferries between Oakland and San Francisco can he given special rates, to be fixed by the Council, which shall not be less than 30 per cent of regular rates.

—A deed of trust from the Southern Pacific Railroad to the Central Trust Company for the sum of $58,000,000 has been filed in the local County Recorder's office. This deed of trust is merely intended as security for the new issue of bonds recently authorized hy the Southern Pacific directors.

—The Board of Supervisors has authorized the San Bernardino county clerk to advertise for sealed proposals for buildlng an addition to the courthouse, according to plans and specifications drawn up by Architect Jones. This is really but a part of the new courthouse now being built, and covers the roofing and inside finishings.

—The creditors of the Navarro Mill Company heid a meeting last Saturday evening. The Anglo-California Bank has an indebtedness of $150,000, T. J. Clunie $115,000, and a second mortgage of $100,000, and unsecured claims aggregating $130,000, making a total indebtedness of $490,000. The creditors decided to resume work.

—The sale of the Pacific Railway Company's property at Los Angeles under a decree of foreclosure took place last week, and as was expected, the Consolidated Electric Railway Company was the only hidder. To the last-named company was knocked down the properties advertised for sale, including all of the franchises and appurtenances of the cable road, for the consideration of $1,344,320.48.

—A movement has been successfully started at Tacoma to hold a general Northwest Coast Fair during the months of August, September and October of next year. All the coast States and Idaho, Nevada, Montana, Alaska and Britlsh Columbia will be invited to participate. The buildings of the Western Washington Exposition are to be enlarged for the purpose. The stock show will he made a special feature. Subscriptions to the fund have already been made, and much enthusiasm is shown.

—The Bodie Railway and Lumher Company, to build a 30-mile road in Mono county and engage in the lumbering business, has been incorporated with a capital stock of $200,000, of which $34,000 has been subscribed. William John Menzies, a capitalist of Edinburgh, Scotland, is at the head of the company, with $33,500 of the stock. Associated with him, each holding $100 in stock, are Thomas Menzies of San Rafael, Charles P. Eells, William S. Wood, E. L. Reese and R. H. Floyd of San Francisco.

—Judge Hanford of the United States Circuit Court for the State ot Washington has granted the application of the Farmers' Loan and Trust Company and Henry H. Trowhridge for receivers for four branch lines of the Northern Pacific in that State. They are: Cascade Railroad, Green River Railroad, United Railroads of Washington and Central Washington railroads. Henry Stanton of New York City, F. B. Howell of Spokane and C. H. Prescott of Tacoma were appointed receivers, under $75,000 bonds each.

—The Anglo-Nevada Assurance corporation has filed a petitlon in the local Snperior Court for dlssolntion. The company was incorporated in 1885 wlth $2,000,000 capltal stock. In 1891 the stock was reduced to $500,000, and last year to $200,000. The London and Lancashire and Caledonia Companies have relnsured the policy-holders. The directors of the corporation are J. F. Bigelow, Louis Sloss, Wm. Macdonald, J. L. Flood, W. H. Dimond, E. E. Eyre, W. F. Whittier, E. L. Griffith, Chas. S. Neal, D. F. Tililnghast and M. H. Hecht.

—Col. H. B. Maxson, with a corps of surveyors, is running township lines out of Lovelock, Nev., to determine if the iron deposits in Buena Vista valley come wlthin the 20-mile grant to the C. P. R. R. If so, the railroad will claim possesslon, and, it is surmised, will hulld a branch line from Lovelock to the ore bodies, there to manufacture their own pig iron to be converted into raiis, etc. A company was organized this summer in New York City to purchase and work the iron hills, but the financial panic came on, upsetting the enterprise.

—The annual meeting of stockholders of the Bank of California was held Tuesday, 20,300 shares being represented. At the election the only change made in the Board of Directors was the substitution of George Whittell in place of Jerome Lincoln. The finances of the institution were reported to be in an excellent condition, total assets reaching $12,783,130.27. During the year dividends amounted to $450,000. William Alvord was elected president; Thomas Brown, cashier; S. Prentiss Smith, first assistant cashier; Irving F. Moulton, second assistant cashier, and Edward S. Hast, secretary.

—An address has been issned by the Executive Committee of the San Francisco Traffic Association reviewing the work of that organization. The saving to the merchants and consumers of this State through the competition introduced by the association is estimated at $500,000 a month. The following instances of saving in freight are cited: Last season dried fruit and raisins in boxes were charged at the rate of $1.40 per hundred pounds; now $1 by rail and 50 cents by steamer, saving from 40 to 90 cents per 100 pounds; canned goods from $1 per 100 pounds last season to 50 cents by rail and 30 cents hy sea at this time; wine reduced from 12½ cents per gallon hy rail and 7½ cents by sea to 3 cents per gallon by all lines; borax from $1 hy rail to 35 cents hy rail or sea; wool ln grease from $1.50 per 100 ponnds and scoured $2.50 per 100 pounds hy rall to 75 cents per 100 pounds hy all llnes; beans from $1.10 per 100 pounds by rail to 50 cents hy rail and 30 cents hy steamer; harley from 90 cents by rail to 30 cents by rail and 25 cents by steamer. Other seeds and California products, including leather, have been slmilarly affected.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, October 12, 1893.

9:30 A. M. SESSION.

200	Belcher	35c	300	Mexican	65c
750	B & B	60c	450	Ophir	1.00
250		65c	30		1.05
50	Bullion	20c	100	Overman	10c
250	Con. Cal. & Va	1.95	250	Potosi	55c
250		1.90	100	Savage	35c
50	Conference	55c	400	Sierra Nevada	50c
150	Gould & Curry	30c	200	Union	30c
50	Hale & Norcross	45c	100	Utah	10c
100	Kentuck	5c	1300	Yellow Jacket	50c

2:30 P. M. SESSION.

300	Andes	25c	160		90c
300	Best & Belcher	55c	210	Sierra Nevada	50c
200	Challenge	15c	35		45c
900	Con. Cal. & Va	1.90	100	Potosi	50c
200	Crown Point	20c	300	Yellow Jacket	55c
350	H & N	40c	25		50c
300	Ophir	95c			

Pacific Stock Exchange.

9 AND 10:15 A. M. SESSIONS.

100	B & B	61c	800	Ophir	1.00
150		63c	700		98c
400	C. O. & Va	2.0	400		97c
300		1.95	200	Nev.	50c
200		1.92½	100		51c
300	Kentuck	6c	250	Union	32c
350	H & N	46c	800	Y Jacket	51c
600		45c	200		52c
100	Mexican	65c	300		50c

2 P. M. SESSION.

400	Best & Belcher	60c	150		1.92½
50		62½	400	Ophir	97c
300	Challenge	12c	200	Potosi	52c
200	Chollar	23c	600	Yellow Jacket	53c
10	O O & V	1.95	350		52c
300		1.90	250		54c

Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned

CALIFORNIA.

Amador.

STRUCK THE LEDGE.—*Ledger*, Oct. 6: The Hardenbnrg people who bave been crosscntting from the 800-foot level to strike the ledgs, have at last reacbed it and are more than pleased with its appesrancs.

C. J. Moore, of the Blazing Star mine, near West Point, in company with Richard McGee of the same mins, bss besn doing some prospecting on the mother lode west of tbe Moore mine.

Mr. Clarkson, who was here in company with Issac Trnmbo a short time ago looking at the Bellweather, accepted S. W. Bright'e proposition to sell the property, the sale to be conenmmated in 30 days. Mr. Clarkson on retnrning home fonnd capital so scarce that he was compelled to ask for an extension of the time originally aeked, which was granted by Mr. Bright.

The Irma people on a test experiment sent five tons of ore to the Selby Smelting Works. The ore was carefnlly selected and being the heaviest in mineral they had in the ore bin. Their retnrns from the rock was $160 per ton gross, and that whicb was left in the ore bin after the selection went $30 per ton in the Gracey mill on the premises. Tbe net returne from the rock sent to Selby'e was $130. This test was made to assist the compsny in deciding whetber it wonld be a profitable investment to pnt in the 10-stamp mill which tbey bave been for some time intending to pnrchase.

The Veta Madre Mining Co. wss recently formed in San Francisco for the pnrpose of developing the Bright and the Shober mines. The property is locsted sonth of Jackson creek npon that division of the mother lode on which is found the Kennedy, Argonant and Alma mines and which has been worked by prospectors in former years, who mined and milled ores to the water level 50 to 70 feet in depth. The Shober covers about 900 feet along the line of lode and the croppings of a valnable ore body have been worked about 200 feet in length and at one point more than 20 feet in width. A well-known firm in Jackson who operated this property sbow returns of $3.50 to $4 per ton free gold from milling of ore taken from a large pit in the ontcrop. The Bright mine adjoins the Shober on the eonth, and ie abont 900 feet in length along its lode line. Shafts have been eunk on this mine, four of which have reached a depth of from 24 to 70 feet, and several lots of ore milled, one of 100 tons milled by the owner gave returne of $7 per ton, and theee excavations with many open cuts ehow a continuous working of over 300 feet. Three hnndred feet of nnreported ground lie between these two prominent ore ontcrops, but the management will locate their main shaft at a convenient point on the lode where both ore bodies can be most economically mined. Work of development will soon be commenced and carried forward continnonsly.

Calaveras.

MAUNA BROS. MINE.—*Chronicle*, Oct. 7: This mine, which is sitnated about 1½ miles from Jesns Maria, is fast developing into a promising piece of mining property. A tunnel bas been run on the vein 80 feet, from the end of which a drift wae started and run north a distance of 50 feet, following tbe foot-wall and the whole length of the drift rock was enconntered that wonld average $4 per ton. From end of drift a crosscut was rnn about 12 feet wben another vein was encountered, two feet wide, the rock averaging $9 per ton. Abont 20 feet from the end of drift a shaft has been ennk to the depth of 70 feet, and the ore that was taken out of the bottom was assorted and milled in tbe Whiskey Slide Mill and averaged $15.50 per ton. It is the intention of the Mauna Bros. to extend the drift some 20 feet farther, when it will connect with the shaft, and tben sink on the lead. The mine is well eitnated for working purposes. Free water power can be had for abont seven months in the year, there is also a splendid mill site and plenty of timber on the gronnd. The work of development is being pnshed rapidly ahead.

Nevada.

AT GRANITEVILLE.—*Herald*: Tbe mining outlook at Graniteville is brightening up. A new mill is being built on the Culbertson ledge, which ie an extension of the National. Twenty men are employed there. The National mine is now working 30 men. The Ethel works 20 men. Work has been resnmed on tbe California mine, with Dana Harmon as enperintendent. Pat Foley, who formerly operated the California, is now interested in a proepect with Phil Hippert. Taken altogether, abont 100 men have employment at Graniteville, and hey will have a good winter.

THE PROVIDENCE.—*Transcript*: Tbis famons mine is wholly owned by five gentlemen—Dr. Liebrick, Peter Tautphans, J. Buttgenbach, W. H. Widman and F. Broekman—all San Francisco capitalists. These gentlemen can trnly claim to be the owners, with probably one exception, of the largest and richest qnartz mine in California, and it is situated in the Nevada City mining district.

BOUGHT A MINE.—*Transcript*: Hon. Jacob H. Neff & Co. have purchased a qnartz mine on Phelps Hill, near Canada Hill, in this mining district. The mine is known as the Santa Rosa and has been prospected eome in years past, the quartz yielding from $5 to $11 per ton. It is a large ledge, the croppings being eleven feet wide, and can be worked cheaply. Adjoining the Santa Rosa is the Alpine, owned by John T. Morgan, D. E. Morgan and others. They have been running a tunnel on the ledge for some time and have met with good prospects.

It is the intention of tbe owners of the Santa Rosa to purchase the Alpine and work both properties as ons. They will open it np thoronghly and erect a big mill. It will be necessary to extend tbe tnnnel only 60 or 70 feet farther to tap the ledge. Although the ore is low grade the ledge is so large that it csn be worked very economically, and the owners feel confident that they have a good thing.

William Floyd, one of the owners, will bs snperintendent, and npon his retnrn from San Francisco will make arrangements for beginning work.

THE MOBILE.—*Telegraph*: Tbe Mobile Company has just had eleven loads of rock crusbed at Gsuthier's mill and the retnrns show that it paid $10.50 a load. The rock came from the surface, and retnrned ss well as the owners expected. This mine is owned by Wm. Dibble and Richard Ganthier, and is situated bstween the Enreka and the Spring Hill. Tbe shaft is down 65 feet and they have a three-foot ledge. The rock in the bottom of the shaft is of a better qnality than that recently crushed.

MINES CONNECTED.—*Transcript*: Tbe Providence, Champion, Wyoming and Nevada City mines are all connected by nnderground passages. Some years ago the drain tunnel of the Nevada City was connected with tbe drain tnnnel of the Wyoming. Later tbe Wyoming and Cbampion mines came together and the Providence and Champion cnt through the wall between tbeir locations. A person csn go down the shaft at the Nevada City mine, on Wood's ravine, and travel underground along tbese tnnnels a distance of nearly two miles, passing under the bed of Deer creek, and finally emerging from tbe month of tbe Providence Company's npper shaft on the hill at the Willisms ranch. It is qnite a novel trip, bnt no one shonld nndertake it without having for a guide an experienced miner who knows the ronte, as a greenhorn is apt to get lost in some of the old workinge.

THE HOME MINE.—*Transcript*, Oct. 7: It is expected that tbe hoisting and pnmping machinery at the Home mine will be in working order by the 20th of this month. The company mean bneiness, and are pntting up machinery capable of working to a depth of 1000 feet. A contract will shortly be let for sinking the shaft 100 feet.

STRUCK IT RICH.—*Herald*: Wben the Blue Jay Mining Company disorganized most of the owners thought there was no obance to make a mine of the Blue Jay. Bnt M. A. Baugb thonght differently, and, secnring a lease of the property, he went to work on it alone. Now he has a eix-foot ledge which will never pay less than $25 per ton, while the specimens he exhibits are worth $20,000 a ton. The rock is very white, and the bright leaf gold sticks ont of it on all sides. Mr. Bangh came down to get a five-etamp mill, and as everything is in readiness for it at the mine, he thinks he can commence ponnding out bis fortnne in a few weeks.

UNWORKED MINE SOLD.—Nevada *Transcript*: Still another of the old, nnworked mines has changed hands, and work on it will be etarted np immediately. The mine is known as the Stiles ledge, which rnns under the prettiest residencee on Broad street, in tbe very heart of our city. The purchasers are Hicke & Co. of San Francisco, and the sale, we understand, was made on Saturday last, the consideration being $10,000. The property has been owned for many years by Daniel A. Rich and his son, Jacob C. Rich. There is a shaft 200 feet deep on Deer creek, below tbe Nevada Fonndry, and from there a tunnel was run up to and abont under the Methodist Church. Tbe croppings of the same ledge are seen on the Nevins lot near the bead of East Brosd street. Some years ago the mine was worked considerably, on a small scale, by tributers, and always paid well, some of the rock milling as high as $60 to the ton. Many years ago, when the mine was owned by the late W. C. Stiles, there was a small steam hoisting plant on the property on Deer creek. A tramway extended from there up the creek and nnder the suspsnsion bridge to tbe sash factory now owned by George M. Hnghes, whicb at that time belonged to Stiles. There was a quartz mill in tbe lower part of the building tben, and here tbe qnartz from the mine was hauled over the tramway in a large car. Stiles worked the mine in this manner for some time, but the hoieting and pnmping rig used wonld not permit of going any deeper, and operations are finally snspended.

Siskiyou.

THE SPENCER LEDGE.—Yreka *Union*, Oct. 4: The Spencer ledge, on Siskiyon mountain, near Cole's, still continues to yield rich-paying quartz, althongh eomewhat narrower at present working, with prospects of widening again on sinking deeper.

The Sterling mine, abont four miles from the Spencer ledge, in Cole's district, on Siskiyou mountain, operated by a San Francisco company, witb a fine new quartz-mill, started up last Saturday, is paying handsomely and bids fair to become one of the most valuable gold mines in Siskiyou.

Some quartz from the Kiernan mine, of the Butterville district, on the headwaters of Shasta river, showed very rich prospects, and bids fair to turn out a great amount of the yellow ore. The shaft has been sunk about 12 feet, with the ledge still two feet in width and prospecting better pay the deeper down the ledge is opened. An arrastre has been put up to crush the quartz, and probably a tunnel may be run into the mountain next snmmer for striking the ledge lower down, where it will also afford good drainage sbould water be fonnd, as will most likely be tbe case.

W. H. Stearns, the enterprising mining man, at South Fork of Scott River, near Callahans, is now engaged in prospecting for an old pay channel by means of drifting. He has run a drift eome 70 feet into the bank and thinks he has fonnd a rich back channel, on which be will commence hydranlic operations next snring, if further prospecting jnstifies his belisf. He has expended already some $8000 in work and machinery, bnt feels confident of soon getting his money bsck, and a good stake besides, when he has plenty of water nsxt spring and snmmer for wasbing down the banks in uncovering tbe pay channel.

The snccess gained in opening the blue-gravel beds at Henley and Greenhorn creek is likely to canse fnrtber efforts in the way of development. It is not actually necessary to delve down to the deepest points in old channels to secnre good retnrns, as rich pay has been realized on reaching the rim and all along the slopes—a fact dsmonstrated by expsrience, especially in old cbsnnels now covered by high land and hills. Tbat a channel of an ancient stream extends tbrongh this county from Siskiyon mountain southward along Shasts vslley and the eastern limits of Yreka basln is firmly believed by many scientific mining experts, and continnes, no doubt, clear down to the Sacramento valley.

Shasta.

THE OKO GRANDE MINE.—*Democrat*, Oct. 4: This mine is situated on what is known as Hostetter Hill, on the east side of Trinity, two and a half miles nortbeast of Carr's ranch, in Trinity. It is the principal mine of a group of six claims at present owned by Jack Strode and brotber, of Whiskeytown. Tbree yesrs sgo this fall Mr. J. Strode and John Bowder located the ground, Mr. Strode baving first discovered the prospect. Together they opened a fine chute of bigh-grade ore on tbe Oro Grande by sinking a shaft and rnnning a tunnel level on the vein to connect with the bottom of the ehaft, which at this jnnction is abont 100 feet deep. A yesr ago thie month Mr. Strode bonght the interest of his partner, Bowder.

Tbe principal development had been done on the Oro Grande, and consists principally of a perpendicnlar shaft 209 feet deep, tunnel level No. 1, 100 feet in length, tunnel level No. 2, 380 feet in length, and sbaft No. 2, 137 feet in depth, which is snnk from the mouth of tnnnel No. 1 to connect with tnnnel level No. 2. Tnnnels 3 and 4 have been started in ore on the vein.

The formation which confined the ore zone in the Oro Grande ie a slate foot-wall and porphyry hanging wall. The width of the wall in all its expoeures was from three to five feet. Mr. Strode fignres 5000 tons of ore in sight in the stoping ground above tnnnels No. 1 and 2. They have let a contract to run tunnel No. 3, which will give a perpendicular depth in line with shaft No 1 of abont 336 feet, and at that point will be 480 feet in on the vein and ore zone. Standing on the gronnd is an inexhaustible snpply of first-class mine timber, and conpled witb a fine water power enables Mr. Strode to prodnce his gold bnllion at a minimum cost.

For abont three months they have been crushing their ore with a cannon-ball mill, and in tbis have worked 119 tons. The firet clean-np, in Jnne last, was 11 ponnds of bnllion; the second, in Jnly, 10½ ponnds; the tbird, on September 11th, which Mr. Strode deposited witb the Bank of Northern California last Friday, was 54 ponnds. The total yield of tbe 119 tons is a little over $21,000.

Tbere is practically no "dead work" in this mine, as all the openings are on tbe vein and in the ore zone. They are now excavating for a five stamp mill, wbicb they expect to have in operation in 60 days.

NEVADA.

Washoe District.

ON THE COMSTOCK.—The following summary of operatione in the leading mines of the Comstock lode is obtained from the official report of euperintendents for the week ended Oct. 7:

From the openings 256 feet sonth from the main shaft, midway between the 1500 and tbe 1400 level of Con. Cal. & Va., we have extracted dnring the week 35 tons of ore assaying about $25 per ton. Have continued making necessary repairs to the drifts on the sill floor of 1650 level. The upraise started in the main northwest drift at a point 57 feet eouth from its junction with the main west drift from tbe C. & C. shaft has been carried np 19 feet; total height 52 feet; top in hard porphyry, clay and qnartz. From tbe drift run eouth at a point 52 feet down from the winze sunk from the crosscut rnn west from the main northwest drift, in working npwards, 16 carloads of ore have been extracted—about 15 tons. The south drift has been extended dnring the week 12 feet; total length 114 feet; face in qnartz. Have shipped to Morgan mill during the week 416 1550-2000 tons of ore, the average assay valne of which, per car samples, was $39.20 per ton. The average assay valne, per battery samples, of all the ore worked at the mill during the week—415 tons—wae $35.20 per ton. Bnllion shipped to Carson Mint, assay valne $16,035.80.

The Union Con. and Sierra Nevada joint north drift, running from the joint west drift at a point 1520 feet west from the shaft, has been extended during the week 19 feet, with the face in clay and qnartz, giving low assays.

Have resumed work on the 1465 level of Mexican, and are now engaged in prospecting by following some narrow streaks of quartz in tbe southern part of the mine. Have continued (jointly with the Ophir compaoy) tbe work of making repaire in the Ophir ehaft. Work has been resnmed on the 1465 level by starting a west crosscut from tbe main north drift at a point 124 feet eonth from the winze station and abont 300 feet north from the main shaft station. This crosscut has been advanced 26 feet and is in a hard porphyry formation. West crosscut No. 5 on 200 level of Gould & Cnrry, started in northwest drift, 432 feet from main west drift, has been advanced 10 feet during the past week, witb tbe formation in face the same when last reported. West crosscut No. 5, started in southwest drift, 100 feet from west crosscnt No. 4 on 900 level of Best & Belcher, has been advanced 8 feet; total length 132 feet; face in hard porphyry.

Tbe sonth winze below the 1000 level of Potosi is down 28 fset on the slope. Tbe bottom sbows 4½ feet of fair-grade ors. Ths nortb drift 28 feet below the 1000 lsvel is out 84 feet. The fsce shows 4 feet of fair-grade ore. Have started a drift north 63 feet below ths 1000 level which is now ont 9 feet. Face is in porpbyry. Extracted and sent to the mill the past week 188 tons and 250 ponnds of ore from the 1100 level. Milled during the week 208 tons. On hand at mill 100 tons and 700 ponnds. Average battery assays $28.61; average car sample assays $32.34. Shipped to the United States Mint, Carson, 482 pounds of crnde bnllion. The north drift 145 feet north of sonth line, 100-foot level of Cbollar, is out 90 feet. Face is in clay and bnncbes of quartz wbich give fsir assaye. Are yet engaged in making repairs to tbe main incline below the 930 level. Advanced east crosscut on 900 level of Hsle & Norcross from winze 3 feet; total length 34 feet. The face of the crosscut has rescbed tbe east clay. Sinking was resumed in the winze during tbe week and the winze sunk 5 feet; totsl depth 28 feet. Extracted 8 cars of ore; average assay valne per csr samples $25.67 per ton.

THROUGH THE OLD SHAFT.—Virginia *Chronicle*, Oct. 10: The Con. Virginia Mining Company are preparing to once more work thie mine throngh the old Con. Virginia sbaft. Abont eight or ten men are employed in and abont the old works making repairs to them. A new gallows frame, foundation and all, is being pnt in, and the scene in the hoisting room, carpenter ehop and yard, where tbe men sre getting timbere ready, is livelier than for a long time. It is qnite a while now since this shaft was sbut down, and the reopening of it will be a pleasnre to record.

The work going on now marks the inception of two new departnres in mining. Wben tbe shafts and drift have been cleaned ont, not only will work be resnmed in the npper levels of the Con. Virginia, but the West Con. Virginia will also work its ground tbrongh this shaft. If Rnle's echeme is carried ont and the West Con. people engage in mining on any considerable scale, a good many men onght to be put to work here. It will be some little time, bowever, before tbe repairs will be finished and the ehaft opened.

Bruneau District.

THE BEUNEAU MINES.—Winnemncca *Silver State*: The Brnueau river, lying partly in tbe nortbern part of Elko connty and distant from the town of Elko from 80 to 90 miles, containe very rich gold placers. These discoveries have been made in tbe laet few weeks. In the latter part of Jnly, J. A. McBride of Elko and Captain Penrod of Island Mountain were ont on a hnnting trip on the Brnneau. Mr. McBride was born and raised among the rich placer mines of Placer county, California. When thev strnck the Bruneau river it presented to McBride the characteristics of a ricb gold field. He told his companion of his opinion, and eoon after their retnrn two parties went out and made several excavations in the bottom lands with the most encouraging resnlts, although on account of water tbey conld not reacb bedrock. McBride sent ont another party to prospect at another point on the river eome distance below where the otber parties had located, whicb resnlted in finding coarse wash gold in paying qnantities in the gravel from near the surface to bedrock. The bed of the river is from 1000 to 2000 feet below the summit of the mountains on either eide, and at several points the river passes throngh narrow gorges of almost perpendicnlar walls. Nnmerons gnlches from three to twelve miles in length, on both eides, carry great quantities of water into the main river from the mountain heights, and donbtless all these contain gold in paying qnantities.

Any power desirable for hydranlic mining can be had not only from the watere of the river, but from many of these gnlcbes during the wbole year. Denver capitalists have lately purchased several thonsand acres of placer ground on this side of the summit and are preparing to engage in extensive mining. Their gronnd extends from near tbe summit down some ten miles toward Elko. Parties are mining in eeveral gulches beyond the snmmit, which run into the Brunean river.

Althongh placer mining to the south and near the Brnnean has been carried on for the last fifteen years or more in a belt fifty yards wide, there is no evidence that any prospecting has been done on the river prior to the late discoveries. It wonld seem that the river itself ought to have long since invited the sbovel and pick. The water courses along an immense fissnre of great depth and crosses the extensive belt of mining country above named. No place between the Sierras and Cascades on the one side and the Rocky mountains on the other, ehows snch violent and immense force in the upheavals from the eomber depths as the country along the Bruneau river. On some of the heights great forests of timber are found, with trees 150 feet in height and several feet in diameter, but they are inaccessible to man, except on foot and by tbe most laborious climbing up rocky and precipitons chasms.

Yellow Pine District.

TO THE EDITOR:—We are almost daily in receipt of favorable reports abont the new gold camp at Crescent, which is 18 miles northeast of Vanderbilt by wagon road, and 13 miles by trail. Twenty men are at work developing the property, and several of tbe concerns there are making arrangements to ship ore to our road. There is also some new activity in the Yellow Pine mining district about Good Springs. This is an extensive lead district, and the increase in the price of lead will help to open up some of the lead mines, as I bave been engaged

In obtaining bids upon several lots of ore for intending shippers at Keystone, which is just southwest of Good Springs and east of Mesquite Wells. The Keystone Mining Company has finished its ten-stamp mill, which started in operation the 20th inst, and has been running successfully. This company has shipped eight carloads of high-grade ore to Pueblo Smelting and Refining Company during the month of August.

GEO. C. MANLY,
Sec'y Nevada Southern Railway Co.

White Horse District.

The Wadsworth *Dispatch* says: The Jim Blaine shaft is now 50 feet deep and a ledge of fine looking substantial quartz has been struck. The prospects for a first-class mine are very bright, and ere long that which White Horse district needs will be established, where ore bodies of good-sized ledges of pay rock can be found by sinking for them. The Jim Blaine is there to stay and demonstrate that there is long life in the camp and reward for the investors.

ARIZONA.

NOTES.—Mohave County *Miner*: Henry Brown is getting ont very nice gold ore from the Eagle mine.

Joe Pomber had five tons of ore from the Prosperity mine worked at the sampler Monday.

The Diamond Joe ore will probably be worked at the Kingman sampler next week. The ore will probably average about 350 ounces per ton in silver.

The Kingman sampling works, since it resumed business, has paid out thousands of dollars for ore. The starting up of the works has been a great convenience to miners who would otherwise be compelled to ship their ores and wait nearly 60 days for returns.

OREGON.

NOTES.—Jacksonville *Times*, Oct. 6: John Bailey and Ed Layton have pounded out $950 worth of gold from rock taken from a claim they have located in Williams Creek district. The claim is on an extension of the Bone of Contention ledge, upon which they have sunk a 12-foot shaft. The ledge is from 12 to 18 inches in width and can be traced several hundred feet.

W. H. Hampton of Portland, the mineralogist, who has secured the Dysert and other properties in Grave creek district, Josephine county, is making preparations to commence the construction of a ditch 15 miles long. This will furnish an ample supply of water, all that is needed to develop one of the richest placer mining districts in the Northwest.

The Siskiyou Quicksilver Mining Co. is making arrangements to run 500 feet of tunnel, and has levied another assessment of one cent a share to raise funds with which to prosecute the work. Mr. Newcomb, who owns a controlling interest, seems to be of the opinion that cinnabar exists in paying quantities, and that the projected work will establish the fact.

NEW MEXICO.

NOTES.—Southwest *Sentinel*: At Georgetown there is very little doing, in fact that camp is the dullest at present that it has been known to be for years. There are but 20 men employed in the entire camp and 15 of them are working on the Pheby mines.

Two bars of bullion arrived from the Colonial Mining and Milling Company on Thursday, and one from Brockman's mine at Lone Mountain.

The Western Belle, at Gold Hill, is looking up in fine shape. It furnishes employment to about 20 men, and the Standard mill is kept in constant operation on the ore it produces. The gold bullion is shipped by express, while the concentrates are shipped through Lordsburg by freight to the smelters.

Casay & Thomas, the millwrights, are pushing the construction of the new mill which will handle the ore produced by the Mountain Key mine at Pinos Altos. Walker & Climo are working about 30 men in the mine, and as soon as their mill is put into operation this number will be greatly augmented. The mill will be completed about November 15th.

The Langston mine, at Pinos Altos, has been temporarily closed down, but will resume again as soon as Mr. Watson returns from the East.

The Aztec tunnel is nearing completion, and when this mine is again opened up a large force of men will be employed in its operation. This will again be one of the finest properties in the Pinos Altos district.

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Market Reports.

The Markets.

SAN FRANCISCO, Oct. 12, 1893.

The course of the silver market has remained undisturbed during the week, and prices have shown only slight fluctuations. The probability of a compromise in Congress on the Repeal bill seems to have no effect one way or the other.

Quicksilver Trade.

The receipts of quicksilver at this port have been as follows:

Months—	1893.	1892.
January	2,243	1,701
February	2,388	1,543
March	1,588	1,875
April	1,623	1,901
May	2,511	1,598
June	2,790	1,614
July	2,014	1,632
August	1,909	2,013
September	1,281	1,753
Nine months	18,347	15,630

Against 9921 for the first nine months of 1891, 9392 in 1890 and 11,464 in 1889.

Coming Rise in Copper.

In copper-dealing circles the belief in higher prices in future is general, and would, moreover, appear to be based on sound reasoning, says London *Money and Trade* of Sept. 27th. The visible supply in Europe is now extremely small—under 49,000 tons, these figures including an estimate of the quantities advised as on their way from Chili and Australia. Prices are also unduly low for this season of the year; but the main reason for expecting a fairly sharp rise lies in the rapidly-changing position in the United States. Owing to the financial stringency there, the Lake companies supplied Europe with exceptionally large quantities of copper at low prices, the total exportation for August amounting to 9040 tons, and during the first fortnight in September the exports continued on a fairly good scale. These extra supplies appear to have been easily absorbed, Germany proving an especially free buyer both for cash and forward delivery. There is a positive scarcity of cash copper here, and during the remainder of the season only small shipments from the States can be looked for. Stocks there are admittedly low, while a good demand is confidently anticipated, now that all currency difficulties are disappearing. It is probable, moreover, that the Anaconda properties will be closed down.

Silver and the Metals.

NEW YORK, Oct. 12.—Following are the closing prices for the week:

	Silver in Loodon.	N. Y.	Copper.	Lead.	Tin.
Thursday	33⅞	73¾	9 50	3 60	.....
Friday	....	....	9 60	3 60	20 90
Saturday	33⅞	73⅛	9 60	3 60	20 90
Monday	33⅞	73¾	9 60	3 60	20 50
Tuesday	.34	73¾	9 50	3 60	20 60
Wednesday	.33⅞	73¾	9 75	3 60	20 55

San Francisco Metal and Coal Market.

ANTIMONY.		**QUICKSILVER.**	
Per lb	— @ 13	Home trade, pr. flask	40 50 @41 00
BORAX.		**STEEL.**	
Refined, in car lots	— @ 7½	English, lb	— @ 18
Powdered, do	— @ 7½	Canton tool	— @ 8½
Concentrat'd, do	— @ 6½	C'k Diam'd tool	8@ 15
All grades jobbing at advance.		Pick & Hammer	6@ 10
COPPER.		Machinery	4 @ 5
Bolt	23 @ —	Toe Calk	— @ 4½
Sheathing	23 @ —	**PIG TIN.**	
Ingot, jobbing	— @ 20	Spot per lb	21½@ 22
Do, wholesale	15 @ 16	**COAL.**	
IRON.		SPOT FROM YARD—PER TON.	
Bar, base	— @ 2½	Wellington	$8 00
Norway, base	— @ 4½	Grsta	7 50
PIG IRON.		Nanaimo	6 50
	Spot.	Gilman	6 00
Eglinton ₩ ton	—@—	Seattle	6 50
Glengarnock	27 00@—	Coos Bay	5 50
Am. Soft, No. 1	25 00@—	Cannel	9 00
Shotts No 1	27 00@—	Egg, hard	12 00
Puget Sound	—@—	Wallsend	7 25
Olay Lane White	30 00@—	Scotch Splint	8 00
Langloan	27 00@—	Brymbo	7 50
Gartsherrie	27 00@—	West Hartley	7 50
Barrow	—@—	**TO LOAD—PER TON.**	
Cargofleet	—@—	Australian	6 50@—
LEAD.		Liverpool Steam	6 87@—
Pig	— @ 4½	Scotch Splint	7 00@—
Bar	— @ 5	Cardiff	7 00@—
Sheet	— @ 6	Lehigh Lump	10 00@—
Pipe	— @ 5½	Cumberland	6 50@—
SHOT.		Egg, hard	9 00@—
Drop, sizes *smaller* than B, ₩ bag of 25 lbs	$1 75	West Hartley	7 50@—
Do do, B and *larger* sizes ₩ bag of 25 lbs	2 00	**COKE.**	
Buck, Balls and Chilled do, ₩ bag of 25 lbs	2 00	English, to load	$9 50@10 00
		Do, spot, in bulk	—@12 00
		Oo, in sacks	—@14 00
		Cumberland	9 50@—

The Stock Market.

SAN FRANCISCO, Oct. 12, 1893.

A very emphatic change for the better has taken place in the mining share market during the week. The reason is mainly the claim of James E. Rule that he knows of the existence of a body of rich ore on the 1100-foot level, old Consolidated Virginia shaft, which he proposes to uncover. Rule's private claim is that while acting as superintendent for Hon. J. P. Jones, who had a lease of the upper levels of the Consolidated California and Virginia in 1884 and 1885, he discovered a new vein of ore above the 1100-foot level, assays of which went $500 per ton. At the time of its discovery he says he had a quarrel with the Jones people over his remuneration for services, and left their employ. This is a well-known fact, and Rule also brought suit against Hon. J. H. Jones, which suit was afterward compromised. He says that during the period of the quarrel he withheld information about the strike of ore, and that that part of the mine where the discovery was made was abandoned, and the drifts soon closed. He now wishes to reopen a certain level above the 1100, and asks for 00 compensation until he has found the ore.

The bullion shipment of the Consolidated California & Virginia for September is as follows: Worked at Morgan mill 1712 tons of ore. Bullion produced: Gold, $25,260.27; silver, $18,573.09; total, $43,833.36. Yield in bullion per ton: Gold, $14.75; silver, $10.84; total, $25.59. Assay value of the ore per ton per battery sample: Gold, $13.86; silver, $12.97; total $26.83. Assay value of the ore per ton, per railroad car samples, $29.55. At the office of the company it is estimated that the mine earned last month at least $5000 over and above its expenses.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

DEVICE FOR ENABLING MOVING BODIES TO PASS OBSTRUCTIONS.—No. 506,037, dated Oct. 3, 1893. George H. Forbes of San Francisco, assignor of one-fourth to George P. Parker and Leo Allenberg of same place. This device consists of a rotatory section having a sliding connection with the load. The section has radial spaced arms, between which it encounters the obstruction, and being thereby rotated, it passes over said obstruction. This section may be a wheel supported upon a track, or it may be one which unites, by a sliding connection, a portion of a frame above and below, as, for example, a cable grip, thereby enabling the whole grip to pass a crossing cable.

COMBINED TRUNK AND DRESSING CASE.—No. 506,033. Dated Oct. 3, 1893. Walfrid Burkman of Tacoma, Washington. The object of this device is to provide a traveling trunk and dressing case combined, in which everything placed in it can be easily found without disturbing articles not wanted, and at the same time to have a cheaply constructed, light, durable and strong trunk. The device is in the shape of a cylinder. It is divided interiorly by a longitudinal partition into two compartments. On one of these garments are to be hung up. In the other shelves are placed to lay garments and other articles upon. In one end of the trunk is a socket and accompanying the device is a portable base with a pin. The trunk when upended is pivoted on the pin and can be axially turned for convenient use as a dressing case.

BUBOLAR ALARM.—No. 506,040. Dated Oct. 3, 1893. Andrew Hartman of Hawthorne, Nevada, assignor of one-half to Charles H. Reynolds of San Francisco, Cal. This alarm is a spring actuated gong which is set in operation by a tripping mechanism lying in the path of movement of the door or window or other entrance. The tripping mechanism is adapted to be readily set out of use when not required, so that the opening of the door will not affect it. But at night it is quickly set back in position again.

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ASSESSMENTS.

Company and Location.	No.	Amt.	Levied.	Delinq't and Sale.	Secretary.
Amador C Mine, Cal	1	5c	Sept 7, Oct 12, Nov 7		P E Luty, 330 Pine
Arnold G and S M Co, Ariz	5	50c	Sept 19, Oct 23, Nov 9		A Judson, 320 Sansome
Bay State M & Dev Co, California	16	2c	Aug 26, Sept 28, Oct 25		A J Coster, Plymouth, Cal
Belle Isle M Co, Nev	19	10c	Sept 23, Nov 2, 24		J W Pew, 310 Pine
Bodie Cons M Co, Cal	16	15c	July 24, Sept 25, Oct 24		M E Willis, 309 Montgomery
Bodie Tunnel & M Co, Cal	17	10c	Sept 5, Oct 7, Oct 24		Chas G Harvey, 309 Montgomery
Brunswick Cons G M Co, California	6	20c	Sept 4, Oct 6, Oct 24		J Stadfeld, 56 Nevada Block
Caledonia G M Co, South Dakota	17	50c	Sept 13, Oct 16, Nov 15		F G Drum, Mills Building
Challenge Cons M Co, Nevada	15	5c	Oct 10, Nov 14, Dec 5		C L McCoy, Mills Building
Chollar M Co, Nevada	26	10c	Oct 9, Nov 14, Dec 7		Chas E Elliot, 309 Montgomery
Cons New York M Co, Nevada	11	5c	Sept 27, Nov 1, Nov 22		Chas E Elliott, Nevada Block
Con Wyoming G M Co, Nev	3	5c	Oct 3, Nov 13, Dec 2		W J Curnett, 306 Pine
Crown Point G & S M Co, Nevada	62	10c	Sept 26, Oct 31, Nov 21		James Newland, Mills Building
Dora Gold Mining Co, Cal	1	5c	Aug 25, Sept 25, Oct 25		Chas J Blumentual, 415 Montgom'y
Kentuck Cons M Co, Nevada	7	10c	Oct 5, Nov 9, Nov 30		Aug Waterman, 309 Montgomery
Martin White M Co, Nevada	29	25c	Aug 31, Oct 26, Dec 14		K L Ross, 120 Sutter
Occidental Cons M Co, Nevada	14	10c	Oct 9, Nov 13, Dec 4		Alfred K Durbrow, Nevada Block
Orleans M Co, Cal	13	2c	Aug 23, Oct 9, Oct 31		Geo P Thurston, 375 Mission
Overman S M Co, Nevada	58	5c	Sept 1, Oct 5, Oct 26		Geo D Edwards, 414 California
Potosi M Co, Nev	39	25c	Sept 11, Oct 16, Nov 7		Chas E Elliott, 309 Montgomery
Siskiyou Cons Quicksilver M Co, Cal	7	10	Aug 29, Oct 5, Oct 27		Edw F Stone, 306 Pine
Telakoff S M & M Co, California	10	1c	Aug 16, Sept 23, Oct 19		W J Gurnett, 306 Pine
Union Con S M Co, Nev	46	20c	Oct 3, Nov 8, Nov 29		Chas E Harvey, 309 Montgomery
Utah Cons M Co, Nevada	19	5c	Sept 1, Oct 4, Oct 25		A W Hawens, 309 Montgomery
Valenzuela Cons M & L Co	2	1c	Sept 20, Oct 23, Nov 10		A Everett Ball, 431 California

MEETINGS.

Company and Location.	Meeting.	Secretary and Office in S. F.	Date
Con Cal & Va M Co, Nev	Annual	A W Havens, Nevada Block	Oct 16
Mayflower Gravel M Co	Annual	D M Kent, 330 Pine	Oct 16

DIVIDEND.

Company.	Amount.	Secretary.	Payable
Coptis Mining Co	16c	E M Hall, Sec	Oct 12

Cal. Debris Commission Notices.

NOTICE.—The California Debris Commission, duly appointed under the Act of Congress of March 1, 1893, having received a petition from Louis Conrath, attorney in fact for the Excelsior Water and Mining Company, for permission to mine by the hydraulic process in the Blue Gravel Placer mine, near Smartsville, Nevada County, California, and to deposit tailings in an old hydraulic pit, hereby gives notice to all concerned that a hearing will be held at the office of the Commission, room 92, Flood Building, San Francisco, on October 17, 1893, at 1:30 o'clock P. M. On and before this hour and date all parties interested may file affidavits, plans, and maps, in support of their respective claims. By order of the Commission: W. H. Heuer, Major, Corps of Engineers, U. S. A., Secretary.

NOTICE.—The California Debris Commission, duly appointed under the Act of Congress of March 1, 1893, having received a petition from H. Buckley and Louis L. Hillman for permission to mine by the hydraulic process in the Illinois Gold Gravel Mine, at Secret Diggings, near La Porte, Plumas county, California, and to deposit tailings in an old hydraulic pit, hereby gives notice to all concerned that a hearing will be held at the office of the Commission, Room 92, Flood Building, San Francisco, on October 24, 1893, at 1:30 o'clock P. M. On and before this hour and date all parties interested may file affidavits, plans and maps, in support of their respective claims. By order of the Commission: W. H. Heuer, Major, Corps of Engineers, U. S. A., Secretary of the Commission.

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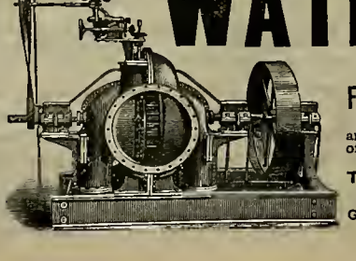

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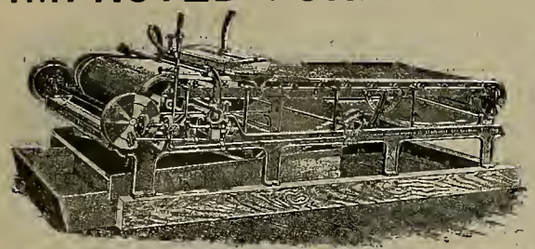

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(Signed) R. G. HART, Sr., Manager Texas and Cleveland Cons. Mining Co's.

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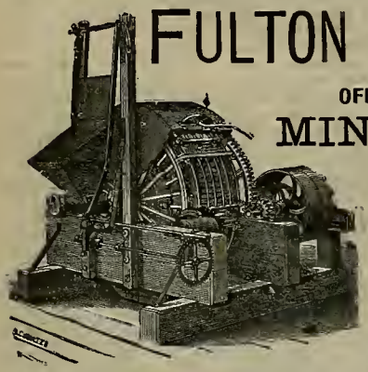

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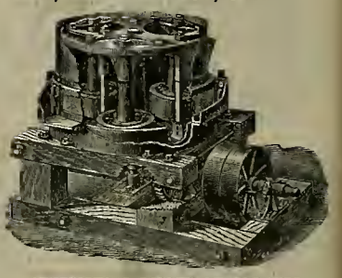

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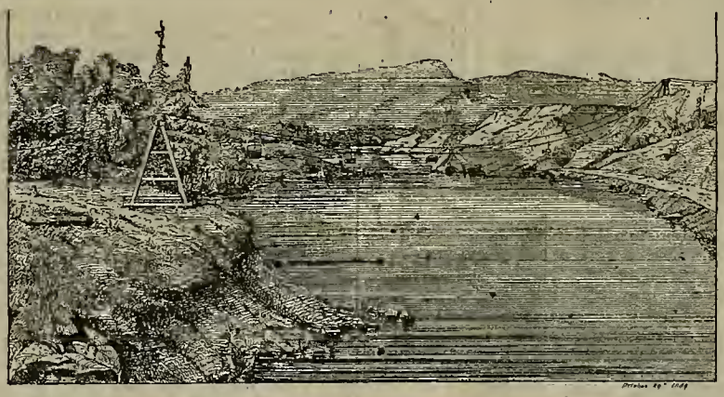

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VOLUME LXVII.
Number 17.

SAN FRANCISCO, SATURDAY, OCTOBER 21, 1893.

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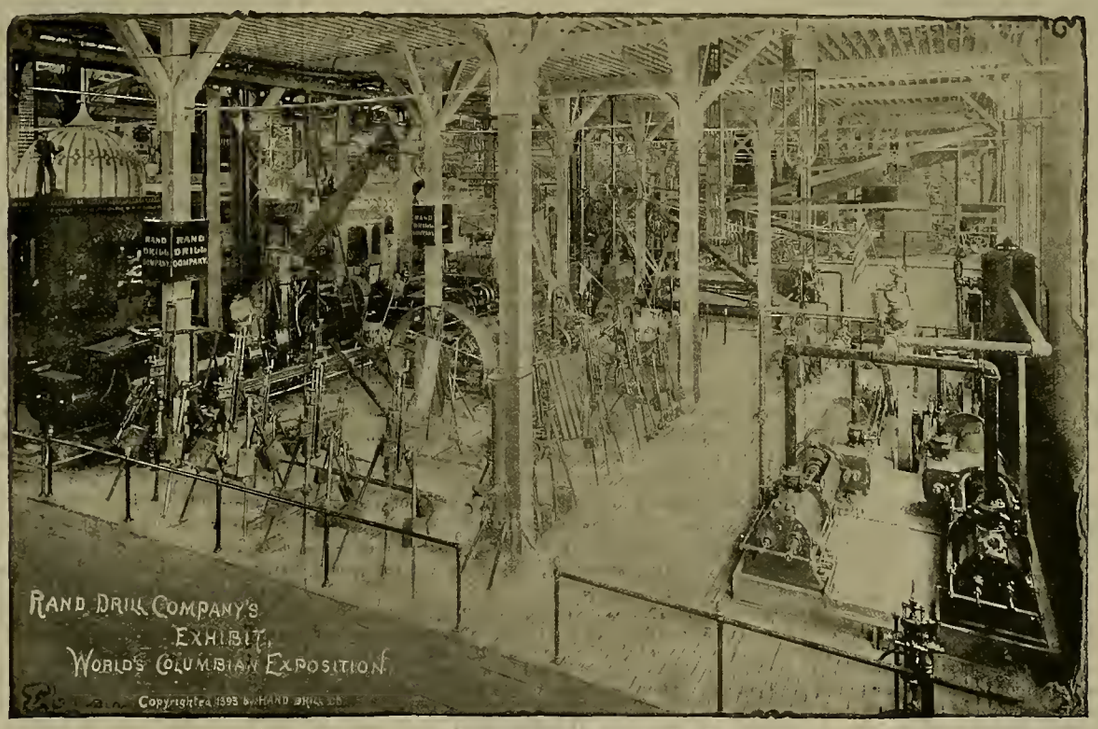
The Rand Exhibit.

Besides the large air compressor in Machinery hall at the World's Fair, of which we presented an illustration last week, the Rand Drill Company has on exhibition in the Mining building a full line of mining machines manufactured by them. The exhibit of rock drills covers a range from the largest used for submarine and heavy contractors' operations, to the smallest, used for block holing and plug and feather work. These sizes are shown in the three different classes, namely, the "Little Giant," the "Slugger" and the "Economizer." They also represent the recent improvements that have been made in valve movements, in the cylinder heads and packing rings. The valve movement of the "Economizer," to which special attention is called, is arranged so as to cut off automatically the admission of air into the cylinder at a certain point and use its expansive force to complete the stroke; thus, it is claimed, doing as effective work as the drill that uses the full pressure of air the full length of the stroke, with a corresponding saving. The new style of head, in which is used only a cup leather ring, instead of the old style of stuffing box and gland, is an improvement that will be appreciated by mine managers and master mechanics.



THE RAND DRILL COMPANY AT THE WORLD'S FAIR.

In the exhibit also is a full line of tripods, columns, shaft and quarry bars, on which the drills are mounted. There is also shown a new style of drill bit made by the company, which is a tube of steel turned at one end to fit the drill chuck, and at the other end arranged to have the hardened steel point fastened on. These points are shaped like the regular X bit, and are furnished by the company at a very low cost. The removal and attachment of the point is very simple; it is pressed on to the drill by a machine which the company provides, and is fastened so firmly that there is no danger of its coming off while in operation, if proper care has been taken. The advantage claimed for this bit is that the current of air which is allowed to pass down through the piston and drill bit when on its downward stroke forces the rock cuttings of the previous blow out of the hole and allows the drill point to strike on the solid rock each time, instead of having the impact force of the blow reduced by striking into and pulverizing the previous cuttings or working in mud.

On the Duplex air compressor, which is shown in this exhibit, a special feature well worth noting is the mechanical valve arrangement for operating the air inlet and outlet valves. This valve motion is operated through a gear and pinion motion and compound springs, by which the inlet valve is opened at the beginning of the stroke and held open till the stroke is completed, thus insuring a full cylinder of air at atmospheric pressure. As soon as the compression stroke is commenced the valve closes, and when the air in the cylinder has been compressed to the same pressure as in the receiver, the outlet valve, from which all external spring pressure has been relieved, opens and allows the air to pass to the receiver. By this movement it has been possible to reduce the number of valves to a minimum and still insure a perfect filling and discharge of the air cylinders. The valve stems are made extra long, and work in long bearings, thus insuring a perfect and even seating of the valves at all times.

Another compressor is exhibited which attracts much attention from those interested in the compression of air or gases, such as oxygen or carbonic acid gas, to high pressures for transportation. Several of these machines are already in operation compressing gases to pressures ranging from 2000 to 4000 pounds per square inch. This compressor is of the upright cylinder type. The compression is carried out in three cylinders, all of which are inclosed in a water-tight tank, of cast iron, open at the top, through which a constant supply of cold water is circulated, insuring the cooling of the gas or air as the compression increases. In operation, the first compression is made in a double-acting, low-pressure cylinder, from which the gas or air passes into a small receiver placed alongside the cylinders, and also surrounded by the water in the tank; from this receiver it passes into the middle cylinder, then through a coil of copper pipe around the inside of the tank and into the high-pressure cylinder, from which it again passes through a coil of pipe in the tank into the high-pressure receiver placed outside, from which it is drawn into the cylinders in which it is shipped. The middle and high-pressure compression cylinders are single-acting hydraulic cylinders made especially for the purpose. These machines are fitted with special high-pressure joints in which no packing of any kind is necessary, and which are always tight under the highest pressures attainable, and which can be taken apart as often as required without impairing their efficiency. Other compressors of the usual kind adapted to various uses are exhibited here.

THE annual report of the African Gold Recovery Company, Ld., operating by the MacArthur-Forrest (cyanide) process in South Africa, says that the company's business has continued to steadily progress, and the MacArthur-Forrest is now recognized as the essential factor in increasing the gold extraction in South Africa. The total Rand output for the year ending June 30, 1893, apart from the process, was 1,087,058 ounces. By the process this was increased by 226,087 ounces, making a total of 1,313,136 ounces. From districts not included in the Rand a further recovery of 2395 ounces was returned, making in all 228,473 ounces due to the working of the process. It will thus be seen that, by the use of the process, the Rand gold production was increased by 21 per cent. If individual returns are examined, the benefit and value of the process is still more forcibly demonstrated. These show that at several of the leading and most prosperous mines 35 per cent to 50 per cent of their gold output is due to using the MacArthur-Forrest process. At June 30th last the process was in operation at 31 mines, and since that date others have arranged to adopt it, mostly on a large scale. After writing-off for depreciation £15,183 5s 3d, there remains the sum of £74,663 13s 4d, out of which three quarterly dividends have been paid, absorbing £26,250. A profit of nearly $350,000 per annum in any enterprise is certainly a very fine showing.

THE silver repeal bill is no nearer passage than two months since; indeed, not quite so near. The contest of "physical endnrance," inaugurated last week by Senator Voorhees, ended in a fiasco, and the Senate is still talking. The air is full of compromise. It looks now as though it must be that or nothing.

THE director of the Lick Observatory has been notified by telegraph of the discovery of a comet at Geneva, N. Y., on Oct. 16th, at 21 hours Greenwich time, its position was R A. 12 hours 21 minntes; and Dec. north 12 degrees 55 minutes. Its motions were northeast.

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San Francisco, October 21, 1893.

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WHAT shall be done with unsold shares of delinquent stock? is becoming a pretty serious question with some of the Comstock companies. Stockholders display about as much unanimity in declining to pay further assessments as they did in making the original investment, and until there is a better outlook at the mines, or improvement in mine management, there is little chance of a more amiable frame of mind on their part. The Hale & Norcross Mining Company holds 26,451 shares of its own stock, and it had a special meeting the other day to decide what to do with it. There were about 72,000 shares represented at the meeting. Three propositions were made for the disposal of the stock. Attorney Wells wished it divided among the other shareholders. E. Tingman thought it should be retained on the books of the company pending a higher market value, and J. W. Twiggs moved that the stock be sold at the Stock Board at no less than 50 cents a share. The latter suggestion was adopted by a vote of 63,278 shares. Recent quotations for Hale & Norcross have been 40 cents. September 7th the figure was 55 cents.

IT is said to be the intention of the House Committee on Ways and Means, now at work on a new tariff bill, to place coal, lead and iron on the free list. The manufacturers of California have no particular objection to free entrance of coal. Indeed, a petition, quite largely signed by local manufacturers, asking removal of the tariff duty, was several months since forwarded to Congress. It is likely, also, that removal of the duty on iron ore would not be regarded as an unmixed calamity by local interests. But the duty on lead is quite another thing. It is 2 cents per pound for pig lead and 1½ cents for lead-silver ore, with ten per cent advalorem added. With lead selling in New York at 3½ cents per pound, or less, lead-silver miners do not feel that they are in position to stand foreign competition.

AMONG other mines proposed to be operated under the Caminetti law are several at Spanish Ranch, Plumas county, which the Debris Commission has recently examined. The Quincy Mining & Water Company has recently been organized for that purpose. These mines were enjoined by the courts, but it is believed that there will be little trouble in impounding the debris. Favorable action by the Commission is confidently hoped for.

THE bill suspending until October of next year the operation of law requiring $100 annual assessment work on mining claims has passed the lower House and is now before the Senate, where, it is said, it meets with opposition. The miners of the Black Hills, South Dakota, insist that the benefits of the bill shall not extend to non-residents.

Wages on the Comstock.

The Comstock wage question would seem to be settled, so far as the miners' union is concerned. Final action was taken last week by the Virginia and Gold Hill Miners' Unions by joint ballot. Polls were opened from 11 to 7 o'clock, and 416 votes were cast; 229 were for $4 and 187 for $3.50. The $4 men won the fight by 41 majority.

It is to be regretted that some more satisfactory termination to the difficulty was not reached. It is not pretended that reduction of miners' wages is the great desideratum toward putting new life into the lode, but it was a factor.

It is not inappropriate in this connection to say a word about labor unions generally. The one vital defect in such organizations is that they seldom know when to make concessions. They find it exceedingly hard to adjust themselves to changing times and circumstances or to adhere to anything but an inflexible scale of wages that must be paid by an employer whether his business is prosperous or not. In times of general depression the unions have more or less trouble in maintaining their own wage scale. Competition is very keen because of the large numbers of unemployed and the natural tendency is toward a lower wage basis. The politic thing for unionism to do would be to render its rules more flexible, and, in many instances, to lower voluntarily its wage minimum, temporarily, or even without condition. The unions seldom do this. They attempt to hold their own without concession. The idle in their own ranks increase and soon make trouble. The employer finds it easy to make terms with this class. The unions are weakened and may be destroyed. It becomes easy to reduce wages of union men without the union's consent. It has become with the union a question of less remuneration or no work, and it must acquiesce. There are no strikes in hard times.

Of course there are exceptional cases like the Comstock miners. But it is evident from the vote last week that here is a large minority which is willing to work for $3.50 per day instead of $4. There seems to be no present prospect that there will be greater activity on the Comstock; and, if not, it is obvious that this minority will grow in sentiment and numbers. It is not designed here to defend the employing class and its method of operation on the Comstock, but simply to point out what it will be enabled to do unless the present status of matters is changed. The miners have already weakened their own cause, and Comstock operators will be the better equipped to wage war on the union, if they so desire.

THE Colorado papers are industriously at work landing Cripple Creek as the "greatest gold camp ever discovered." The situation has recently been such in Colorado that a reasonable amount of exaggeration is perhaps to be overlooked; indeed, enthusiasm over their gold fields is not only natural but commendable. Nevertheless, people who have not the fortune to live in Colorado may be excused for hesitating to accept without a grain of salt the Colorado view of Cripple Creek. It is undoubtedly a very promising camp and has a fine future, but we do not think the following statement, found in a local paper, altogether true:

"The C. O. D. mine of Cripple Creek is working four men at $3.50 per day. In sinking the shaft they take out five tons per day of gold ore, worth $100 per ton. This is equal to 25 ounces of gold at $20 per ounce. Deducting $20 per day for total expenses leaves $480 as the product of a day's labor. This gives the following results: Total product for one day, 25 ounces gold; total cost per ounce, 80c; total cost on the dollar, 4c."

Of course Colorado papers themselves do not all accept such statements seriously. They should do all they can to discourage their circulation. In the end, it will be found that they do much mischief.

AMONG awards at the World's Fair in the mining department are the following: For history and literature of mining and metallurgy, MINING AND SCIENTIFIC PRESS; California State Mining Bureau, reports of the State Metallurgist of California; Copper Queen Consolidated Mining Company of Bisbee, A. T., series of models of Copper Queen mine, model illustrating the manner of timbering sloped ground with square set model in glass and wood, clearly defining the horizontal and vertical sections of underground work.

PRESIDENT J. H. NEFF of the State Miners' Association has appointed the following to act as an executive committee at large in arranging a Midwinter Fair exhibit: J. J. Crawford, Colonel Frank McLaughlin, Professor S. B. Christy, S. K. Thornton and W. C. Ralston. Mr. Neff has also appointed an advisory committee of three gentlemen to confer with the executive committee, consisting of Hon. R. McMurray, J. Z. Davis and W. S. Chapman.

Work of the Debris Commission.

The number of applications to mine under the Caminetti law is steadily increasing. Since the organization of the Debris Commission, thirty-one different mines have either made formal application or have inquired how to proceed in order to secure the necessary license. Thirteen formal applications have been made, and hearings have been had in five. One permit has been granted—the Farrel mine, in Nevada county—while Messrs. Mooer & Boyd, of the Kelly Hill mine, Butte county, have been directed to go ahead with construction of their dam, the plans for which have been approved by the commission. When finished, and if built in accordance with the plans, the necessary permit to hydraulic will be given. The Farrel mine is already in operation, behind old impounding works, which have been improved and repaired; and the commission has just issued the necessary permit for the construction of two additional feet on the dam.

The thirteen mines which so far have applied formally for license are as follows:

Kelly Hill mine, Butte county.
Farrel mine, Nevada county.
Omega mine, Nevada county.
Brandy City mine, Sierra county.
Blue Nose mine, Pilot Peak, Plumas county.
Blue Gravel mine, Yuba county.
Illinois mine, La Porte, Plumas county.
Phœnix mine, Hepsidam, Sierra county.
Eureka mine, Downieville, Sierra county.
Craycroft mine, Downieville, Sierra county.
Excelsior mine, Downieville, Sierra county.
Bean Boys mine, Clipper Mills, Butte county.
New York mine, Sierra City, Sierra county.

Part of these applications have been advertised and others will follow in due form. No doubt a large part of the remaining mine owners who have placed themselves in communication with the commission will sooner or later conform to the law by regular procedure. The commission is beginning to find its hands full of work, and excursions to the sites of mines are becoming frequent.

It is significant that nearly all the above thirteen mines have been operated before, and many of them were closed down in consequence of the Sawyer decision. Of course all are ready to take proper care of their tailings, and various devices for that purpose are suggested. The Craycroft mine, for instance, on the north fork of the north fork of the North Yuba, submits a sketch of fifteen dams which can be placed in series at various locations along the stream. It is probably not designed to use all these dams, but only as many as the commission may think necessary to protect the streams and riparian interests. No mine will be allowed to operate without the proper guaranty that tailings will be cared for. At the same time, the commission will impose no undue or unnecessary burden upon the miners. Masonry dams will not be required, except, of course, in special instances. It will doubtless be found that brush dams will be wholly adequate in the majority of cases. The Caminetti law was framed for the purpose of giving hydraulic miners an opportunity to resume work. The commission will fully carry out the spirit and intent of the law, having full regard for the interest of the miner and the welfare of the farmer. It is a fact that no application to mine has yet been rejected. Doubtless they will be. But none will be until the applicants have had a fair chance to demonstrate whether or not their tailings can be safely impounded.

Lieut. C. C. Gillette, assistant engineer of the commission, has entered upon the discharge of his duties. Mr. Gillette is a competent engineer whose experience has qualified him for work in this field. He was graduated from West Point in 1884, and remained 2½ years at Willets Point, near New York, in the engineering service. He was then made assistant to Col. Merrill, who had charge of part of the Ohio river and tributaries. He was engaged for a large part of five years in work on the Muskingum river, also, constructing brush dams. He was later engineer officer of the Department of the Missouri, in General Miles' staff, stationed at Chicago. Mr. Gillette's experience on the Muskingum in the construction of dams will be of value to him here.

THE executive committee having in charge the collection of a State mining exhibit for the Midwinter Fair has already begun its preliminary work. Consultations have been held with Fair officials and an allotment of 10,000 square feet of space secured in Machinery hall, adjoining the mining machinery exhibit. The design now is to make it the most complete and elaborate showing of California's mineral resources ever before undertaken. The executive committee is not yet able to announce the exact style of exhibit but it will be formidable in quantity and choice in quality. The task of securing the material will be comparatively easy, but it will be necessary also to secure sufficient funds.

Small and Chinese Mines.

[By Charles G. Yale, United States Mint Statistician.]

In view of recent suggestions for the unemployed men in this city to go to the mountain counties and work in the old abandoned diggings, it will be well to inquire as to the proper localities, if the idea is at all practicable. Personally, I do not believe it is, for several reasons. Most of these men know nothing whatever of mining and would make a poor flat of such work. They have no implements, own no ground, have no cabins or places to stay, no outfit of any kind, such as blankets, provisions, etc., and if helped to get to old mining camps would not know what to do when they arrived. Moreover, the winter is just approaching and the snows of the mountains would greatly retard work, so that most of the men would soon become discouraged.

Another thing, too, many of the old claims have been worked over and over again by Chinese, who are very skilled at this sort of work, and even they now find such ground rather scarce—that is, ground which will pay.

However, it may be that some men would find ground where they could make $1 to $2 per day during the proper season. They must work on placer, or surface ground, though, for it takes money to work a quartz claim when it is found, and the miners nowadays are not abandoning any ledges that will pay at all. These unemployed men could find no work at the "going mines," because there are more miners now in the State than can find steady work, many having lately come here from silver camps in other States. If they go to the mountains they must depend on their own exertions; must find the ground, get a place to sleep, cook, etc., and obtain picks, shovels and other tools, all of which is rather difficult for a man who is "broke."

I want to call attention, however, to the fact that a large part of the gold product of this State still comes from the "small mines," and the gravel diggings in the rivers, banks, ravines and gulches. Around every mining locality are numbers of small claims operated by a few men, and the aggregate product of such claims foots up a tidy sum every year.

The Chinese, too, take out a large sum in gold annually. It is very difficult indeed to obtain any accurate figures of products of mines operated by Chinese. Of course they never answer any circulars of inquiry, and seldom disclose anything about their operations. The merchants, bankers, gold-dust buyers and express agents of different localities, however, are able to make an estimate of the product of the small mines and the Chinese.

All these figures are collected by the United States Mint for the report on the product of the precious metals issued annually by the Director of the Mint. From the data available from this source I have set down the product of the small mines and Chinese miners of the different counties in the State. It will serve at least to indicate where most of the small mining and Chinese mining is being done. It will serve also to draw attention to the importance of these small mines, when considered in the aggregate, and to show what the Chinese are getting out of the auriferous gravels.

Of course many large claims leased from white men are now worked by Chinese, but these are omitted in these tables. The claims bear American names, and it is not always possible to know them from white men's claims. No consideration either is given to any producing mines (of which there are numbers) which may not be classed as "small mines or Chinese."

As will be seen, the aggregate product of these small mines and Chinese miners equals about one-third of the total gold product of the State. The figures are based on those of last year's product, and are for gold only, the silver yield not being considered.

County.*	Total Product.	Small Mines.	Chinese Mines.
Amador	$ 1,210,383	$ 88,066	$ 9,400
Butte	388,848	69,652	45,762
Calaveras	794,681	78,029	15,085
Del Norte	4,000	4,000	.....
El Dorado	198,321	114,482	67,330
Fresno	112,981	100,900	7,731
Humboldt	87,315	42,800	15,330
Inyo	49,925	5,200	.....
Kern	107,788	72,190	15,600
Lassen	15,400	9,000	.....
Los Angeles	219,204	5,500	.....
Mariposa	80,011	27,588	9,452
Mono	396,298	35,940	8,934
Nevada	1,945,408	105,336	92,049
Placer	1,159,079	46,648	152,875
Plumas	432,294	90,055	67,300
Sacramento	121,900	51,550	58,650
San Bernardino	47,037	3,060	.....
San Diego	395,517	72,953	.....
Shasta	574,832	35,288	28,500
Sierra	888,464	165,400	73,900
Siskiyou	1,018,331	317,490	315,768
Trinity	1,446,603	135,505	225,600
Tulare	24,356	11,600	3,000
Tuolumne	1,092,540	856,806	8,752
Yuba	44,217	5,200	15,000
Totals	$12,571,900	$2,054,303	$1,282,503

So, over a quarter of the State's gold product comes from the small mines, and the small Chinese miners get enough of our money to support many families of men now idle.

CHARLES G. YALE.

* The figures presented by Mr. Yale at the State Miners' Convention, reported in last week's issue of this paper, have been revised and are here presented in their correct form.

Slickens.

THERE is a letter at this office for C. B. Dugan.

EX HUME has resigned his position as foreman of the Texas Consolidated mine at Old Diggings, Shasta county.

THE West Harmony, Harmony, Mountaineer and Providence mines paid out $25,000 at Nevada City, last Saturday.

THE new 100-stamp mill of the Phœnix Mining Company, on Cave creek, near Phœnix, Arizona, will be completed by November 15th.

THE Alaska-Treadwell Gold Mining Company of Douglas Island, Alaska, will pay a quarterly dividend of 37½ cents per share, or $75,000, on October 28th.

AN indication of reviving good times in Idaho is found in the announcement that the working force in the Red Elephant mines, near Hailey, has been doubled.

THE newly incorporated French Gulch Mining Company, in this city, is to operate the American mine, formerly the Wheeler mine, French Gulch, Shasta county.

THE pay-rolls of the Comstock for September were $62,924. This is $13,887 less than for August, and shows the effect of discharged labor. The amount paid out is the smallest in thirty years.

T. H. OXNAM, well known in California, who has been in charge of the De Lamar Company's mines in Idaho, has been transferred to the Harqua Hala mines, Arizona, in the same capacity.

THE Spanish mine, in Nevada county, recently bought by Colgate of New York, is not the Spanish mine, in Washington township, which holds the belt for profitable production of low-grade ore.

THE September report of the Potosi mine shows 1124 tons of ore worked, yielding $19,809. The assay value of the ore was $22.35, out of which $17.62 per ton was obtained. This is equal to nearly 79 per cent.

THE Calaveras *Chronicle*, published at Mokelumne Hill, has entered upon its 43d volume. It is the oldest weekly paper in California. Still it is looking active and healthy, and hasn't a gray hair in its head. May it live long and prosper.

THERE has been filed in the recorder's office of Placer county, at the request of John Spaulding, a mortgage for the sum of $1,500,000 executed for the South Yuba Water Company in favor of the Farmers' Loan and Trust Company of New York.

THE Exchequer Mining Company has re-elected the old directors and officers, with Charles Hirshfeld as president, A. K. P. Harmon vice-president, Charles E. Elliot secretary and A. C. Hamilton superintendent. The company has $591.33 in its treasury.

F. A. HUNTINGTON, of this city, has bonded for $32,000 for three months the Silver Cave and Sacra mines and Silver Cave millsite near Dos Cabezos in Cochise, county, Arizona. Hugh McCrum and John Sronfe of San Francisco and L. C. Hughes, Governor of Arizona, are the owners.

ANOTHER dividend of ten cents per share has been declared by the W. Y. O. D. Mining Company, at Grass Valley. The dividend makes the seventeenth declared by the company. The mine looks splendidly and the stockholders may look for regular dividends from present indications.

W. F. C. HASSON, a well-known electrical engineer, has been selected by the Amador Electric Light and Power Company to supervise the purchase and inauguration of the plant which is to be placed in Sutter Creek in a short time for the purpose of furnishing light in Jackson, Sutter and Amador.

THE Grass Valley *Union* recently stated that the well-known Allison Ranch mine had been sold by A. E. Davis to Prof. James D. Hague for $60,000. The statement is, however, denied authoritatively. The mine has been idle 17 years, after being a wonderfully rich producer. It employed about 250 men at one time.

THE W. Y. O. D. mine at Grass Valley has elected the following Board of Directors: Louis B. Parrot, J. R. K. Nuttall, Jacob Weissbein, Joseph Weissbein and P. F. Simonds. J. R. K. Nuttall is president; Joseph Weissbein vice-president; Jacob Weissbein, secretary; Weissbein Brothers & Co., treasurer. The mine is in a prosperous condition.

O. G. HYMAN, Thomas Cole, William Bowers, G. W. Grayson and R. R. Grayson have been elected directors of the Nevada Queen Mining Company. R. R. Grayson was chosen secretary. A cash balance of $482 was reported. Of the 100,000 shares in which the capital is divided, 34,470 shares are not out, and of these 28,355 shares were represented at the meeting.

E. M. ROOT is president of the Atlantic Dynamite Company, vice Albert Dibblee, resigned. Several weeks ago Mr. Dibblee resigned as president of the Giant Powder Company Consolidated, and Mr. Root was elected to the place. Mr. Dibblee was president of these companies for many years and he retires on account of old age and illness. He has gone East.

E. B. THOMAS, superintendent of the Spring Hill mine, Nevada county, has disappeared with money which was paid him by the company to pay off the wages of the miners. Thomas represented a Sacramento mining company, the officers of which assert that the property taken was probably about $900 and a bag of amalgam. The workmen will lose nothing.

THE Mayflower Gravel Mining Company, at its recent annual meeting, elected the following: F. Chappellet, president; F. H. Green, vice-president; directors—Charles Mayne, F. W. Zeile and H. Bendel. D. M. Kent was re-elected secretary and his financial statement showed a credit of $20,196. During the year the company produced $188,000 and paid out $56,000 in dividends. A bullion shipment valued at $2200 has just been received from the mine.

CRIPPLE CREEK, Colo., is soon to have railroad connection, and there is much rejoicing thereat. The camp now is experiencing quite a boom. Several notable sales have recently occurred. The figures and mines are given as follows: The Hart group of four claims at Cripple Creek was sold for $40,000. The Ida May and John A. Logan claims on Bull mountain were bought by Kissel, Otis & Connor of Colorado Springs for $30,000. W. E. Neberry took a bond and three months' lease on the American Eagle claim for $42,000 and 20 per cent of the output. The Little May, Lawrence and Australia were sold to Count Pourtalles of Colorado Springs for $40,000. Senator Dorsey also bought the Providence mine for $30,000, and W. E. Guyette the Camilla for $15,000. Recently the El Dorado group of 12 gold mines at Breckinridge in Summit county sold for $80,000. Two years ago they brought $30,000.

SUPERINTENDENT LEGGETT and Foreman Roy of the Standard Consolidated mine at Bodie found eight sacks of ore in an abandoned crosscut on the 400-foot level of the mine the other day. How long the ore had been there is not known, though it is probable some one hid it years ago with the intention of stealing it from the mine when favorable opportunity presented itself. The ore is very rich, and some of it is said to be the richest found in the camp. The value of the find is variously estimated from $7000 to $10,000.

THE best route to Johannesburg, South Africa, is overland to New York, then to Southampton, thence to Capetown, and from there to Johannesburg. The lowest steerage fare via the Canadian Pacific to New York and the trip to Cape Town is $123. From Cape Town to Johannesburg by rail the cost is $25 second class, $40 first class. Steerage fare to Cape Town, going to New York via the Central Pacific, is $140. The cheapest one could make the entire trip for would be $153, which represents cost of transportation only. But, judging from reports of dull times at Johannesburg, the cheapest way to go is to stay at home.

AN exchange gives the following: Prospectors, when out of reach of assayers to test their ore, can by the following method determine whether the rock to be tested carries mineral or not: When you desire to make the test, pulverize the rock very fine; then take one part of the pulp and two parts of common gunpowder; mix them together with enough water to make a stiff dough; work it up and mix thoroughly together in your hands; then form it into a cone or pyramid and let it dry in the sun or near a fire. When dry, set the cone on a flat stone and put a live coal on top of the cone. When it has sizzed and spluttered itself out, the mineral, if there was any in the rock, will be found in the shape of a button on the stone.

WHAT is said to be the biggest lump of coal ever handled is in the Washington State building at the World's Fair. It is of gigantic proportions, being 26 feet in length, 5 feet 8 inches in width and 5 feet 4 inches in height. It weighs 50,280 pounds—about 25 tons—is semi-bituminous in character, and was dug from a slope 1700 feet in length, with a dip of 18 degrees, of the Roslyn mines of Washington. This lump is 22,250 pounds heavier than the lump from the New Abram mine of Lancashire, England, and 26,850 pounds heavier than the lump from the Hocking Valley mine of Congo, Ohio. Washington has a coal area of 1,000,000 acres, and it is therefore fitting that the largest piece of coal should come from its mines.

CHARLES MARION TYLER, mining engineer, has made to the Midwinter Fair people a proposition that attracts favorable notice. Mr. Tyler's idea is to have a pyramid of standard silver, say three feet square at the base, twenty-one feet high and one foot square at the top, put up in bars or sections, as most desired, or as most convenient. Such a pyramid would weigh about 29½ tons, and would be of a value exceeding 1,000,000 of our standard silver dollars. Such an exhibit would certainly command much interest. Many people have heard and talked of a million of money, but very few have seen it, and here would be a million that would attract attention from every one. The rest of Mr. Tyler's scheme is that there should be close by a smaller pyramid of standard gold. This structure would be say 16 inches square at the base, 50 inches high, and four inches square at the top, and would weigh about 3685 pounds. The value of such a pyramid of gold would also be about $1,000,000, and might be built up of fives, tens and twenty-dollar gold pieces of American gold. Now, who will furnish the gold and silver?

Foundry Notes.

INVITATIONS to the launching of the battle-ship Oregon have been issued by the Union Iron Works. The war vessel will slide into the waters of the bay on Thursday, October 26th, at 11:46 A. M. A neat engraving of the new man-of-war is at the top of the cards, and underneath appears this lettering: "Christened by Miss Daisy Ainsworth, representing the State of Oregon, and Miss Ruth Dolph, representing the navy; launched by Miss Eugenia Shelby, representing the city of Portland."

THE Union Iron Works will furnish an engine for a large part of the power to operate dynamos and other machinery in the Mechanical Arts building at the Midwinter Fair. This engine is part of the contribution of the Union Iron Works to the Exposition. It is a 600-horse power engine fitted as a condensing engine, and will be placed on a concrete foundation eight feet in depth at least, or deeper if the character of the ground requires. The diameter of the H. P. cylinder is 22½; diameter of L. P. cylinder, 39; stroke, 24. The number of revolutions to the minute is 160; boiler pressure, 130; diameter of steam pipe, 6; diameter of exhaust pipe, 14; H. P. condensing, 600; H. P. with 100 pounds boiler pressure, 520; total weight of engine complete, 75,000 pounds.

MR. GEORGE E. WOODBURY, of the Woodbury concentrator, has just returned to this city from a trip to the World's Fair. He had a highly enjoyable trip, and shares the popular enthusiasm over the magnitude of the great exposition. "I was not particularly anxious to go to Chicago," said Mr. Woodbury to a representative of the MINING AND SCIENTIFIC PRESS. "I had attended the Philadelphia Centennial and I thought I saw and learned enough there to last a lifetime; but the Chicago fair is immensely larger and finer than the Philadelphia—but you know all about that. The exhibit of mines and mining machinery is particularly creditable. It is immense, and attracts all the attention it deserves. There are vast quantities of minerals from all parts of the globe. All the mining States make excellent showings, and foreign countries are largely represented. In mining machinery California certainly holds her own, and compares favorably with any other State or country. The Woodbury concentrator, as you know, was awarded both a large bronze medal and a diploma—the highest form of award offered by the exhibition. The points on which the award was made were efficiency of work and excellence of construction. In connection with the Woodbury concentrator were shown a Huntington ore-feeder and a 3½-foot Huntington mill."

Chinese in California Mines.

[Written for the MINING AND SCIENTIFIC PRESS by Hon. R. H. Campbell, State Senator for Siskiyou, Trinity, Shasta, Modoc and Lassen counties.]

The statistics read before the Miners' Convention by Mr. Charles G. Yale giving the amount of gold produced from small mines and Chinese mines in the different mining counties were somewhat surprising as well as interesting. They showed that the small mines in this State produced in 1892 $2,054,303, and Chinese mines alone $1,232,503. It was surprising, no doubt, to many to know that so much gold was being taken out by Chinese in some of the counties—in Siskiyou, for instance, where the amount known to be taken out by Chinese reaches the enormous sum of $315,263 per annum, to say nothing of the unknown amount taken out by these untiring and never-ceasing gold-getters. It is, in my opinion, safe to place the unknown quantity of gold taken out by them at 20 per cent of the known amount, which would swell the annual output of gold by Chinese to $378,315 in Siskiyou county alone.

Admitting this to be the case in all the mining counties where Chinese mine, and adding 20 per cent to the known product, we have the sum of $1,479,003 in gold taken out by Chinese in this State annually.

This is not as it should be, and shows how our State is being filched of its precious metal by these Asiatics. As soon as one gets possession of a few hundred dollars or a thousand or two, he packs himself off to China with it and never a dollar of it returns; but, as soon as one leaves with his little pile, another takes his place, and so it has been going on for years and years. No country on earth could stand such a drain upon it unless it was teeming with wealth. But we, with all our great resources, are beginning to feel it, and the time is near at hand when all this gold that has been extracted from our gold mines, and packed off to China during the last 40 years, will be greatly missed by our rising generation.

The hold the Chinese have upon our mines in this State does not speak well for our mining men, especially the laboring miner who uses the pick and shovel, for, in almost every instance where Chinese mine, little or no capital is needed—simply organized labor. This is where the Chinese excel. Ten, twenty or forty Chinese will join in a company, open up a claim, and work harmoniously together, while there are few instances where two or more white men, especially Americans, can work together and agree. Even one working alone will occasionally disagree with his work and repair to the nearest watering-place or resort (saloon) and enjoy the hospitality of the transient public and candidates that happen along making their campaign. He becomes so fascinated with this life that, when the summer is gone, he concludes to stay all winter. So he becomes a regular dead beat and anti-Chinese howler, while the Chinamen do all the mining and rake in all the gold-dust.

Of course there are exceptions, but, as a rule, you may go where you will among our mining camps throughout the State and you will find plenty of this kind who do no work, but do plenty of growling, while they invariably owe the store-keeper and the boarding-house. The Chinaman owes nothing.

I am opposed to Chinese coming here or staying here, but cannot help but mention the fact that many of our white miners might do well to pattern after the Chinese in some things.

Nowhere in the State is mining carried on more extensively and successfully than in Siskiyou, and among the Chinese in Siskiyou are found some of the best river, placer and drift miners in the State. The cause for their concentrating in this county is from the fact that Siskiyou offers a wide field for the Chinese favorite kind of mining, viz., river and placer. The Klamath river alone affords a continuous stretch of over 150 miles in length, to say nothing of the Scott, the Salmon and the numerous tributaries, the whole of which has been given over to the Chinese. The Chinese operate some of the most extensive drift mines in the county. They form large companies and purchase large mines, paying $10,000, $20,000, $30,000 and in one instance $50,000 for a single mine, and no one will ever know how much gold is being, or has been, taken out by these people.

I will cite one case that came under my own observation which will give some idea of how they work. The Wong Sing Co. owned a mine adjoining my own. There were 20 shares in the company, but in nearly every case two or three Chinese owned one share, making perhaps 50 owners in the mine. The mine paid well. Being a near neighbor, I frequently visited them and knew nearly every Chinaman personally. But, after a few years, my visits became less frequent, and before I knew it, all were strangers to me. Finally, it became necessary for me to purchase their mine or have trouble with them on account of dumpage, and, in treating with them, I discovered that not a single one of the old, original lot was there. All were new and strange to me.

I began making inquiries about this one and that one whom I had known to be partners in the mine a few years previous. The answers were invariably, "He go China; him cousin buy him share." How many Chinamen and how much gold that one mine sent back to China, the good Lord only knows.

The Chinese own and operate nearly all the river mines in Siskiyou and a large portion of the gravel drift mines and quite a number of the hydraulic mines, and, as a rule, are the best miners, practically speaking, that we have.

R. H. CAMPBELL.

Rule's Proposition Accepted.

The stockholders of Consolidated California & Virginia held their annual meeting last Monday and heard the reports of officers for the year. There were 25,613 tons of ore extracted during the year, which were milled by the Comstock Mill and Mining Company, yielding in bullion $524,196.74, or $20.46 per ton of ore. Of this amount $288,663.27 was in gold and the balance in silver.

The old Board of Directors was re-elected as follows: Charles H. Fish, George R. Wells, W. S. Lyle, C. O'Connor and N. T. Messer. A. W. Havens was reappointed secretary, D. B. Lyman superintendent and the Nevada Bank treasurer.

The annual financial report showed receipts for the year amounting to $632,199.74, of which $108,000 was from an assessment and the balance from bullion. The balance on hand now amounts to $61,656.34.

An interesting feature of the meeting was the proposition of James H. Rule to open up a paying body of ore above the 1100-foot level, whose whereabouts are said to be known only to him. A resolution was passed, placing the direction of operations in the hands of Mr. Rule.

The directors can provide men, mining implements and material necessary for the extraction of this ore at an expense not exceeding $4000 per month for not more than six months, Rule to receive ten per cent of the net proceeds of the bullion product until the amount paid him aggregates $10,000. It is the first time in the history of this mine, which made the gigantic fortunes of the old bonanza firm, that any outsider has been permitted to direct operations. It appears that the confidence of the stockholders is based partly on sentiment, for Rule has always been lucky, and has uncovered several valuable mineral deposits in various mines.

The stockholders of the mine need to have faith in Rule, and a good deal of it, if they expect ore to be found which shall convert the mine into a dividend-payer. If the mine produced during the year $20 ore, and still it was necessary to cover a deficit of $108,000 by assessment, it would be very interesting to know just how high a grade of ore must be found before the assessments cease, and Irish dividends are no more. In California, $3 ore can be made to pay.

Ore Deposits of the United States.

A new work has been received at this office from the presses of the Scientific Publishing Company, New York, on "Ore Deposits of the United States," by J. F. Kemp, Professor of Geology in the School of Mines, Columbia College. Since the publication of "The Metallic Wealth of the United States," by J. D. Whitney, in 1854, no complete review of the ore deposits of the country has appeared, and a revolution has taken place in many of the theories of ore deposition, consequently Prof. Kemp's work is now not only the only book giving full and latest information relating to the ore deposits of this country, but it is also the only work giving modern ideas on this important subject. Prof. Kemp's treatment of his subject is consistently geological and the principles of origin have been made as prominent as possible. The literature is cited in its completeness, but the references have been annotated as to whether they are specially recommended for general consultation, for their historical record, or for complete investigation. In the division of space, the more important regions have been naturally given the greater amount, and the effort has been made to preserve thus a proportion, and not to be too much influenced by purely scientific considerations. At the same time, it is believed that no district of any importance has been overlooked, and that, if it is given but passing mention, the references will place the full literature at command. It is fully realized that there are many important districts, especially in the West, of which our recorded knowledge is limited, and which need study and description. It is hoped that the book may emphasize these, and encourage the study of them. The materials for the book have been assembled for lectures and instruction in economic geology, which have been given by the author during the last seven years, five at Cornell University and two at the School of Mines, Columbia College. The price is $4.

What Was the Output?

Replying to a recent article in this paper, giving $10,000,000 per annum as the common estimate of the output of the idle hydraulic mines, the Marysville *Democrat* complains that "not one of the story-tellers has ever produced facts to prove his assertions." The *Democrat* immediately makes this vague statement: "The MINING AND SCIENTIFIC PRESS is reminded that the anti-debris people raise more grain, fruit, wool and other products in one year than will overbalance in value the output of all of the hydraulic mines in any two years of their existence." But it advances no fact to prove its assertion, which is unfounded and untrue. The product of the hydraulic mines has been a subject of much controversy, and it is difficult, not to say impossible, to show exactly what it was. But we do know that in the years preceding the Sawyer decision, the California output of gold was larger by many million dollars than at present; and we do know that the falling off in the product has been almost wholly due to the cessation of hydraulicking. According to the engineers, the value of lands involved in controversy with the hydraulic miners was about $3,000,000. Their products per annum were scarcely as much.

In the article which the *Democrat* criticises, we stated that "the anti-debris people have apparently not been able to raise enough additional grain, fruit, wool, hops, hides or vegetables to compensate for the loss. All their interests affected by the debris fight are not half as valuable as one year's output of these idle mines." The first statement can scarcely be disputed; and the second has been shown to be sufficiently exact. In conclusion, the *Democrat* denounces hydraulic mining as a "nuisance," a "detriment," and a "curse." These are harsh terms, quite in keeping with the past attitude of the anti-debris agitators. But abuse is not argument, nor will it prevail against the general sentiment in favor of the hydraulic miner. He has been "flat on his back" for some years, as President Neff puts it, but the public is now willing that he shall arise. Legislation designed to assist him has been enacted, and doubtless further aid will be given. But the *Democrat* can take comfort in the reflection that all adverse interests will be protected, including newspapers with two-horse power boilers and ten-horse power whistles.

The Flour-Gold Problem.

Still another process for saving flour gold has been invented by Dr. C. B. Brierly, of Boise, Idaho. As described by local papers, it consists of a sluice-box of ordinary size, into which are set in grooves copper amalgamated screens. The screens, any number of which may be placed in the sluice, are arranged in sets of three, each set being a foot or thereabout apart. The center screen of each set is placed in a vertical position and the other two are arranged at opposite angles of about 45 degrees each. These screens are placed in a slanting position in order to present a greater surface to the water. In the first set of screens the meshes are about 20 in number to the square inch. The meshes are finer in each succeeding screen until in the last there are 40 to the square inch.

The dirt is first put through a grizzly or a series of grizzlies and the finer particles with the gold pass into the sluice-box and through the first set of screens. Here some of the gold is caught in the meshes of the amalgamated copper wire. As it goes on, passing through the finer and still finer screens, all the gold is saved. In order to make a cleanup the screens are removed and the amalgam brushed off, the same as in the case of amalgamated plates.

The inventor has tested the machine on Snake river, and fire assays are said to have failed to bring to light any traces of gold in the tailings.

THE very great activity of the Nevada City (Cal.) mining district, compared with a year since, is shown by the following statement by the *Transcript* of the number of mines now in operation:

Spanish,	Odin,
Nevada City,	Manzanita,
Champion,	Lyons,
Providence,	Bellafonntains,
Mountaineer,	Yosemite,
Wyoming,	California,
Reward,	Gold Tunnel,
Home,	Green Mountain,
Santa Rosa,	Ellison,
Alpins,	Knickerbocker,
Mayflower,	Yellow Diamond,
Pittsburg,	Stiles,
Gold Flat,	Coan,
North Banner,	Ebangh,
Federal Loan,	Hussey,
Harmony,	Baldwin,
West Harmony,	And several others.

One year ago the total was less than ten.

Studies in Gold-Milling.

NUMBER IV.

[Written for the MINING AND SCIENTIFIC PRESS by J. A. Edman.]

An examination of the concentration products of gold mills, as obtained under the modern methods now generally applied, reveals much of interest, both to the millman and mineralogist, and particularly when the microscope is brought into use. Among the concentrates of a well-managed quartz mill, the miner can find and study all the heavy minerals within his lode, of which many may have escaped his observation during years of mining and old mill practice, and many of which are gold-bearing. As among the ores, we here find that the decomposed ores furnish concentrates containing the greatest variety of minerals. Here, while the sulphides are less prominent, gold-bearing oxides in all forms abound, and a great variety of crystalline, heavy silicates, titanates, etc., present beautiful and interesting forms for the mineralogist although generally barren of gold.

In concentrates from hard ores, pyrite forms the prevailing mineral, with a variety of other sulphides, arsenides and antimonides, as well as tellurides and selenides, of which many are present in very minute forms and often microscopic. Among these, the most perfect are derived from ores where the valuable mineral is interspersed throughout the mass; where it is massive, the concentrates generally show irregular grains with the crystal form scarcely perceptible.

As an illustration of the size of grains may be quoted the percentages obtained from samples of concentrates from two large wet-crushing mills, running on pyritous ores and using screens equivalent to 35 mesh. These averaged 55 per cent passing a 100-mesh screen, 20 per cent passing 200 mesh, and nearly 10 per cent of grains 1·400 inch and less in diameter. These are not exceptional cases, although in general larger-size grains predominate. Gold is but sparingly visible in the quartz sands of such concentrates, but floured mercury is present, mostly in very minute forms, as the larger globules are collected in the distributors of most belt machines.

As concentration is to great extent dependent upon the densities of the minerals treated, a list of the principal gold-bearing minerals is subjoined, giving specific gravities, beginning with the highest, mostly taken from Dana's System of Mineralogy:

		Spec. gravities.
Tellurides and Selenides	Calaverite	9.0
	Selenide of gold and silver	8.0 to 8.5
	Hessite	8.3 — 8.4
	Sylvanite	7.9 — 8.3
	Nagyagite	6.8 — 7.2
	Galena	7.2 — 7.7
	Mispickel (arsenical pyrite)	6.0 — 6.4
	Copper glance	5.5 — 5.8
	Bornite	4.4 — 5.5
	Hematite	5.3
	Pyrite	4.8 — 5.2
	Marcasite	4.6 — 4.8
	Goethite	4.0 — 4.4
	Chalcopyrite (copper pyrite)	4.1 — 4.3
	Zinc blende	3.9 — 4.2
	Limonite	3.6 — 4.0

The following table shows the densities of rocks generally forming the gangues of gold-bearing lodes:

	Spec. gravities.
Quartz	2.6
Talc	2.7
Talc schist	2.6 — 2.8
Calcite and limestone	2.5 — 2.8
Clay slate	2.5 — 2.8
Chlorite	2.8
Dolomite	2.9
Hornblende rock	3.0 — 3.1

For comparison will be given the specific gravities (calculated) of various percentages of gold with quartz, the gold being taken at 18 and the quartz at sp. gr. 2.6:

	Value per ton.	Sp. gr.
½ per cent gold in quartz	$ 2,000	2.67
1 " " " "	4,000	2.75
2 " " " "	8,000	2.91
3 " " " "	12,000	3.06
4 " " " "	16,000	3.21
5 " " " "	20,000	3.37
Gold and its alloys as found in ores and in placer deposits		14 to 19

From the above tables it appears that the densities of the ordinary gangues vary from 2.5 to 3.1, while the gold-bearing minerals exhibit specific gravities from 9 to 3.6, limonite being the lowest in the scale. As limonite often is an alteration product of iron pyrite, we find in all decomposed gold ores every gradation between the bright pyrite of 5.2 specific gravity to the dull and earthy limonite of 3.6 in density, the change generally progressing from the surface of the pyrite crystal. As the original gold contents of the pyrite generally remain intact, the gold in the limonite, whether massive or pseudomorph after pyrite, is often of great value without materially increasing the specific gravity, as can be seen by a comparison of the relative densities of gold-bearing quartz.

As the facility and success of concentration generally is in proportion to the difference in specific gravities between the prevailing gangue and the gold-bearing mineral, it follows that bright pyrites and other heavy sulphides may easily be separated from a quartzose and even a talcose or hornblendic veinstone, but when the attempt is made to concentrate oxidized pyrites, the difficulty increases with the oxidation of the sulphide, and when below a density of 4, becomes nearly impracticable on belt concentrators. As very rich limonites are found of specific gravities 3.8 and less, the result is a loss of much of the gold-bearing material, which passes off with the tailings. With talcose, chloritic or hornblende gangues, scarcely any pure limonite can be concentrated.

The success of concentration on any particular lot of ore can generally be estimated by careful panning, and any millman, skillful with the pan and the batea, can realize for himself what degree of difficulty he may meet in concentrating oxidized pyrite or limonite. The oxidation products of other sulphides occasion less loss, as they, when not in powdery form, generally are of a higher specific gravity than the iron oxides. A loss often occurs in concentrating, due to the floating of broken pyrite, resulting in the conchoidal or cup-shaped fracture of that mineral, for which reason the breaking of the crystals should be avoided as much as possible.

An examination of typical samples of concentrates from prominent gold mills of California points to the necessity of sizing before concentration, without which no perfection can be attained. Concentrates from one mill will vary in size of grain from 1·30 inch to 1·600 inch, while frequently 60 per cent will pass an 80-mesh sieve. This can be considered a full commentary on battery crushing of highly pyritous ores. The practice yet extensively prevailing in California of milling such ores without previous sorting or treatment is open to many objections, principally from the difficulty in handling the concentrates economically. Many instances can be cited of ores carrying over five per cent of sulphides, subjected to the routine of battery crushing, concentration and chlorination. Often a large portion of such ores could be sorted to a grade of 25 to 50 per cent sulphides, and be treated either by roasting and smelting, or by roasting in bulk and subsequent grinding, or by crushing and chlorination after roasting.

In practice, concentration of gold ores appears suited only to hard or but slightly altered veinstones, carrying a moderate percentage of sulphides or other heavy non-oxidized minerals. For decomposed and highly oxidized gold ores, a different treatment is imperatively demanded, or many of the best gold mines in the United States will remain dormant.

The at present generally approved and prevailing system in the larger gold mills of the United States may be stated as consisting of the following operations:

1. Breaking the ore by jaw crushers, or by the very efficient rotary crushers of the Gates pattern.

2. Crushing in stamp mills with varying weights of stamps, size and shape of mortars and apertures in screens.

3. Amalgamation in battery and on plates, stationary or percussive.

4. Concentration on belt concentrators, generally without previous sizing.

5. Roasting of concentartes in reverberatory or revolving furnaces.

6. Chlorination of the roast by the Plattner process or in barrels.

7. Leaching and precipitation of gold and silver from solution in various ways.

This system, while undoubtedly very effective on many hard ores with a moderate percentage of well-diffused sulphides, yet has some defects inherent in the method.

1. Gold, being generally well diffused in the gangue, is not set free from the quartz by the stamping.

2. The sulphides, being friable, are to great extent slimed and become unsuitable for successful concentration.

3. Amalgamation in battery, being altogether accidental and foreign to the original intent of the stamp action (namely, a moderately fine crushing), cannot be regulated or perfected by any known appliances, as is evidenced by the entire want of uniformity in weights of stamps, height and rapidity of drops, sizes of mortars, depth of discharge and sizes of screen apertures, and also by the constant variation in the condition of amalgam obtained in battery. Amalgamation on plates, except in few instances, is unsatisfactory and difficult of control, from reasons already stated when referring to amalgamation products.

4. Concentration becomes difficult with grains of all sizes, and fails entirely in arresting the rich sands of low specific gravity, necessitating subsequent treatment of the tailings.

Under the above system the paradox becomes evident of the extreme care used in saving concentrates, which for California may be averaged as carrying $100 per ton, while the rich sands, worth $2000 per ton and more, are permitted to escape without hindrance.

Various other milling processes have been brought forward of late years, to overcome some of the above-noted defects, and prominent among them may be mentioned the chlorination process mainly consisting in crushing by rolls, drying, sizing by revolving screens, roasting the whole of the uniformly sized product in revolving furnaces, and chlorinating in barrels. This is undoubtedly for many ores as near perfection as can be desired, but cannot be applied to low-grade ores, the cost of milling being at least $3 to $4 per ton.

In another direction a notable advance has been made by the continuous-grinding process introduced by M. P. Boss, and generally applied to silver ores, but being in some respects, and with some modifications, eminently fitted for gold ores. Here crushing is done by stamps, and comparatively coarse screens are used. The pulp in a continuous stream flows into grinding pans, thence into amalgamating pans, and finally to settlers. This is mainly a grinding and amalgamating process, the slimes not being treated, but may be concentrated, if so required. The expense of this plant will preclude its general adoption.

A thorough crushing and grinding, combined with amalgamation, has been achieved by the designer of the Bryan mill, now coming into favor on the Pacific coast, and used both on gold and silver ores. In action this mill partakes of the qualities of both arrastre and Chili mill, and consists of heavy iron rollers revolving in a circular path with moderate speed. Here the crushing is good, the contact of gold and mercury prolonged enough to give efficient amalgamation, and the flow of the pulp gentle. The great weight of metal appears to be the chief objection to this mill if used in a large plant, but it is certainly a step in the right direction toward perfect reduction.

It must be admitted that for simplicity, cheapness and effectiveness on many free-milling ores, the stamp battery as constructed in the United States, and especially in California, yet occupies the foremost place among successful machinery as a crusher; an effective device exclusively for amalgamation of the pulp, used in connection therewith, would be a great desideratum, and can be achieved when inventors and millmen will work in that direction, instead of multiplying concentrating devices, of which already enough exist to meet all practical demands.

But a thorough remedy for the losses yet occurring in gold-milling should be sought in perfecting methods of grinding, to reduce our gold ores to such sizes as will set free most of the metallic gold, and in combining this improvement with an amalgamation based upon true physical and chemical principles. From ancient times gold-miners have used a machine which meets many of these requirements, and the genius of modern invention, if applied to its improvement, would, in the writer's opinion, bring us nearer to a perfect milling system than any other known line of mechanical reduction. The old-time arrastre, the gold-miner's constant and reliable friend, furnishes the germ for elaborating a rational system of gold-milling. The success of the Bryan mill and the Boss system of rolling is due to an adoption of the principles evolved from modern arrastre practice in its best forms. In discussing the capabilities of this method, it will be pertinent to inquire into the condition and physical aspects of gold ores and their products by mechanical reduction.

The Tuolumne County Fair.

TO THE EDITOR:—The mineral exhibit at the annual fair, Twenty-ninth District Association, attracted a great deal of close attention during four days—October 4th, 5th, 6th and 7th. It was pleasing to note the extreme surprise of those who pressed round the railings that enclosed the display of minerals, gold-bearing rocks, and the beautiful rich specimens of the precious metal, glistening in the rays of the electric lights. The now famous Rawhide mine exhibited one block of quartz, literally covered through and through with gold and tellurium, of about 200 pounds weight: also other richer samples could be seen in the glass cases. This rich find was only discovered the past week. It was taken from the 400-foot level of No. 2 shaft in the drift running southeast, being eight feet wide. The general rock will mill into the hundreds per ton. It is without doubt the old rich shoot that was found in the early days in No. 1 shaft, or south shaft. No. 2 shaft is known as the "Jack Rabbit." Through the kindness of W. A. Neviles, the superintendent, this display was loaned to the fair directors for exhibition. Yet far richer pieces can be seen at the mine, one block of 400 pounds being held together almost entirely by the gold itself. The mine is veritably a honanza.

Tuolumne county is in reality a mining county. The famous mother lode of California runs through it on the west, and the upper belt of rich lodes is found east of Sonora. About equidistant from both belts millions have been extracted, and doubtless millions remain awaiting the miner and capitalist to explore and invest. Geologically and mineralogically speaking, this county possesses the formation for the prolific production of gold. The past results prove this assertion. If an obelisk (a gilded one, if

you please) was constructed, giving the cubical area of all gold fonnd since 1850, it would astonish the most sanguine. Mule-loads of gold were taken out of this county close to and surrounding Sonora in the early days; also from the environs of Columbia and Shaws Flat, and the various gulches and creeks contributed their millions—all placer or pocket deposits. Where did all this gold come from if not from the erosion of our auriferous quartz veins, which time and the elements have denuded? Yet almost to the present day, with hut few exceptions, we have no deep explorations. For instance: the Eureka Consolidated at Summersville is the deepest, heing over 1200 feet and still sinking; the old Confidence, on the underlay—being a flat lode—800 feet; the App, nearly vertical, mother lode, 800 feet, who are taking ont very rich ore to-day; the old Souleshy mine, 800 feet, from which millions have been extracted; the old Patterson, 750 feet; and the Sonora Bonanza, 900 feet on the underlay, which produced immensely rich ore. One piece of quartz of the latter yielded $40,000. From three of the above-named mines millions have been taken out. I could mention a score or more of other mines in the county that have yielded hundreds of thousands in gold coin. But, with all this showing, Tuolumne in late years has been greatly neglected, hut I am happy to state that her mines are now, at last, receiving the attention they merit and she must soon take her place in the front rank of gold producers.

The cause that has militated against this county is apparent and two-fold. Firstly, our mineral lands have been wrongly absorbed by the rancher, and in this respect the Land Office, in a measure, is much to blame, because its requirements are too lax in not compelling the rancher to prove it is non-mineral, instead of being asked to swear that the land in question is more valuable for agricultural than mineral purposes. Some of our best auriferous lands have been thus lost to the miner. Secondly, those who own mines have stood much in their own light, asking ridiculous prices in many cases for undeveloped properties, or holes in the ground, more properly speaking, when they have hut a very small prospect and on no defined lode. Yey they may prove valuable, if opened up. Many capitalists would he glad to invest if given a reasonable chance to develop on a working bond. Wildcat and pig-in-the poke claims cannot, or should not, demand cash till they are able to show a distinct value, but should give the privilege to develop, under certain restrictions, to those who seek to invest. If this plan were more frequently adopted in this county our population would soon double itself. But I fear you will think that my preface is rather long, so will *revenons à nos moutons.*

The following is a list of some of the most conspicuous exhibits and the names of the contributing mines:

Rawhile mine—Rich and beautiful specimens of milling ore.
Santa Maria—Owner, John Neale; situated on the Yosemite road; rock is rich in free gold; sulphurets[value, $2000 per ton—ten per cent. Mr. Neale has heen 17 years struggling to open his mine, has at last reached the goal of his hopes aod his expectations are realized.
Carmelita—io same section as above; rich ore.
App—Mother lode; rich rock.
Eureka Consolidated—Good rock.
Fairview—Sulphurets, high grade.
Noonday—Rose creek; rich rock.
Monitor—Sugar Pine; rich ore.
Buena Vista—Near Santa Maria; rich rock.
Silver Queen—Yankee Hill; good rock.
Rising Sun, or Sonora Extension—Arrastreville; maoy samples, rich in free gold, and high-grade sulphurets.
Crystalline—Mother lode; rich ore.
New Albany—Upper belt; good rock.
Keltz—Many samples rich ore.
Ruby—Rich rock.
Comstock Raoch—Rich rock.
Easton—Rich samples.
Sonorita—Near Rising Sun; good rock.
Golden Gate—Sonora; very handsome specimen of sulphuretted rock, very rich.
Buchanan—Good rock.
Mina Verda—Columbia; good rock.
Conlin & Graham—Sawmill Flat; rich rock.
Belcher—Groveland; good rock.
Gem—Mother lode; rich samples.
Gerymanda—Good rock.
Joe Major's Raoch—Good rock.
Souleshy—Rich ore.
Joe Hooker—Rich samples of ore.
Crown Point—Spring gulch; many samples rich io free gold.
And many others which space will not permit to notice.

In the glass cases, carefully guarded, were rich gold specimens, including samples of gold-hearing placer cement, inclosing heavy, water-worn gold, from Table mountain. The quartz specimens, some of great beauty, are valuable for the gold they contain, as well as their fantastic forms, but the choicest are still in the Chicago Exposition. I think the gem in the collection helonged to Louis Page, heing a pinnacle of crystalline gold four inches in height and interspersed with crystals of tellurium of the variety petzite. Mounted on a velvet hase and rising or rearing itself under a glass hemispherical dome it was very much admired. It was found in his mine at Brown's Flat.

The following gentlemen exhibited very handsome collections of gold specimens of great intrinsic value: Messrs. M. B. Harriman, D. Oliver, E. Kiel, F. Conrad, Louis Page, Henry Munroe and C. Fitch.

Columbia Marble Exhibit.—The exhibit from the above works was small in quantity. By a good display they could have added greatly to the effect of the mineral collection. Had they sent, as last year, an obelisk of their various particolored marbles the general effect would have been greatly enhanced. What should have been one of Tuolnmne's most interesting exhibits was thus hardly represented. We trust at the next fair, in 1894, the marble works will take the hint, which is given in kindly spirit, to furnish a center shaft or colnmn of composite construction, showing their heantiful and varied kinds of marble, worthy to represent their handicraft, as well as the beauty of a natural and valuable product of this county.

Lastly, Mr. John Neale exhibited a very fine collection of jewelry in gold of his own manufacture, the gold being obtained from the mines of the county. Mr. Neale also exhibited a pretty collection of quartz crystals, nice souvenirs of Tuolumne, mounted in gold, having a beautiful and simple effect, in the shape of pins and brooches in the latest styles. His collection obtained first premium. We also noticed rare crystals of silica, chalcedony, silicified woods, and a specimen of rubellite or red tourmaline. ARGUS.

Tuolumne county, October 7, 1893.

Origin of the California Stamp.

[Writteo for the MINING AND SCIENTIFIC PRESS by Mr. C. P. Staoford, 2401 Buchanan Street, San Francisco.]

I find in your valuable journal of August 26th a paper read at a recent mining meeting in Cornwall by Capt. Josiah Thomas, manager of the Dolcoath mine, descriptive of the California stamps recently introduced by him into the county. After the paper was finished the question was asked by Mr. E. G. Heard whether Capt. Josiah Thomas could tell him where the stamps were invented and why they were called California stamps. Not harring Captain Josiah's facetious answer, I am able to give the following reply to Mr. E. G. Heard's question:

In the winter of 1850–51 a company was formed in Placerville, El Dorado county, California, for the purpose of exploring for gold-hearing quartz. The region chosen for exploration was from Mathenas creek west on both sides of the north fork of the Cosumnes river, and as far west as Shingle Springs. Much hard and unsuccessful work was done and continued until ahout the 8th or 10th of April, 1851, when it was decided to settle up our company affairs and disband. But before separating, and as we were sitting about our camp-fire, some one proposed that we explore a certain difficult region that had been neglected. The proposition was agreed to. It was also agreed that we go in pairs, taking three different but (roughly) parallel routes, returning to camp by the trails at night, and sharing the results (if any) equally.

A discovery was made. The last two men to get into camp brought word that they had fonnd large outcroppings showing gold everywhere. They had found what was afterward known as the Union quartz mine, and later as the Church-Union, and is now owned by Senator Perkins and others. The discovery was made on the 12th day of April, 1851.

To make sure of our title we moved immediately and made our camp on the ground claimed. After cutting away the brush and building a wagon road down to Mathenas creek, ahont half a mile distant, we rested, and hegan to discuss what we should do with our discovery. It was decided presently that the only thing we conld do was to huild a quartz-mill and work onr mine.

In the meantime the Tennessee Quartz Mining Company below us, on the Cosumnes river, having heard of onr discovery, sent us word that they had a steam engine, and iron shaped and punched for a hoiler, together with the machinery and irons for a complete five-stamp mill—a duplicate of one they had erected and were running. If we wanted a mill they would sell us the duplicate. We had often seen theirs in operation, and immediately decided that one like it would answer onr purpose.

Now, leaving out here a long, long story, I will only say that the mill was bought and set agoing, and paid for. None of the present generation can ever know what that meant in the spring and summer of 1851 here in California. This was not, however, the "California stamp-mill," hut was the mill out of which that was developed. Let us take a look at it.

We see no California improvements yet. It was just such a mill as had been made in Tennessee and other Southern States previous to the discovery of gold in California. The hed for the mortar block and the battery frame consisted of layers of timbers crossing at right angles, tamped with sand and flooded with water. On this was placed the frame of the battery, and between the posts was fitted the mortar block, not standing on end and deep in the ground as now, hut lying on its side as did all the timhers under it. It is easy to see now how springy and unsuitable such an arrangement was.

On the block was placed a low mortar, and the sides were huilt up of plank and carefully secured with rods and holts and screws. But, alas! what a leaky affair. In the mortar stood five stamps, each consisting of a head eighteen inches long by six inches square, *without any shoe*, and a timher ten feet long by seven inches square. Through this timber was a slot wide enough to let the cam play freely through it. The upper end of this slot, when the stamp stood on the die, was ahont on a level with the upper side of the cam-shaft and was the point at which the cam took hold of the stamp to lift it up and drop it, the stamp being kept in place by suitahle guides, top and bottom. The cams were much straighter than the tangent cam now used.

There it stood. It looked to our inexperienced eyes all right. Indeed, we felt a little proud of it; thought we had a better mill than the Tennessee company. But on starting it we soon found the weak point.

Two of the stamps had become much shorter than the others. On opening the mortar, we found the two stamps had parted from the head. Of course the dove-tail tenon was destroyed and the lower end of the timber badly bruised. The stamps were all taken down and the fastenings to the iron head more carefully fitted.

After heing replaced and having run several hours, we found that the heads were of the softest iron and had assumed the shape of a sled-runner, next to the feed opening. The battery was left standing, and a man was dispatched to Sacramento with sketches for a hoss provided with a shoe. This shoe had a tenon which fitted a corresponding jaw in the lower end of the head. The shoe was held in place by a key driven through jaw and tenon, the keyholes being arranged so as to have a "draw-bore" effect.

We ran that battery till some time in the winter of 1851–52, hut (without specifying further) everything about the stamps and mortar proved unreliahle. Every forenoon was spent in repairing, the hattery calling for the main part.

Not far from us another mill was built soon after ours, but was never run much, as the ore did not pay. One day I went over there. I found it boarded up close and apparently deserted. However, I turned trespasser and, loosening a board, went in. I found the stamps like ours, except that the lower end of the stem was square-tapered and dropped into a correspondingly square socket in the top of the boss. At the lower end of the boss was another square socket, which corresponded to a square-tapered horn on the shoe. This horn was provided with fillets at the corners of each of the four faces, bringing the bearings close to the corners of the socket. This, however, had proved a bad arrangement, for a numher of the corners of the sockets were broken out by the force of the two fillets on each corner of the horn. The remedy for this difficulty was easily indicated. Make the horn and socket round. This led presently to the idea of making *all* the parts to the stamp round instead of all square, and make the stem of iron. At this point came into view a fairly clear vision of the stamp as we see it now in a California stamp-mill. But as yet it was only a vision.

I told my brother (president of our company) what I was thinking of, and directed the carpenter to make a model of a stamp as above described. The stem was about three feet long by one inch in diameter, the hoss being two and a half by six inches long. The shoe was two and a half by two and a half inches, and all held together hy the tapered horn and stem forced slightly into the tapered sockets in the boss. This was the first concrete form of the California stamp.

Armed with this model, my brother and I decided to approach certain of the company and propose the building of a hattery on this line. This was received with some favor, but the company as a whole would only consent to putting in one stamp in the middle of the old battery for the purpose of trying it; at the same time enjoining me to make it as cheaply as possihle.

Well, this was something. So I left the next morning for Sacramento. No iron was there such as I wanted, which was a piece of shafting ten feet long by three inches in diameter. I went on to San Francisco. No iron was in all the town of that size, but Messrs. Egery & Hinckley had two pieces, 12 feet by 2¾ inches, one of which was sent np to Sacramento to the Sacramento foundry. Here, in due time, a stamp was fitted up and sent to the mill and put in place of the middle wooden stamp. On starting, it won its way easily. It came down with such evident efficiency that

it was not long before the company decided to have a new battery. This was in the autumn of 1851.

Incidentally, while down at San Francisco for iron for this one stamp, I had learned from Mr. Egery (of Messrs. Egery & Hinckley) that they had afloat a small lot of 2¾-inch shafting that would be due early in the following February. So all we could do was to wait for that iron.

I came down about the 6th of February, 1852, and found the iron had come. As we could use the old battery as it stood, all we needed was the five new stamps and their fittings. These I remember Mr. Egery sent us with very gratifying promptness. It was not long before we had our new stamps running.

But in this first battery the stamps did not revolve. They were held from turning by a short arm from the top of each stem, standing out at right angles to the cam-shaft. The outer end of these arms played in suitable slots.

We had an engineer and machinist in our employ, who took great interest in our new stamps. His name was Isaac Fisk, a man full of resources in his line. He suggested the idea of modifying the tappet so as to present a full face clear round the stem, and, removing the arms and slots, let the stamps revolve at will. But our old-fashioned cams were not curved enough, nor was the curve drawn on the right principle. A simple investigation showed that the corner of the cam would rake across the corner of the tappet during a part of the lift; and it was thought that both would be ruined directly. But Fisk contended that it would work, so we tried it on one stamp, and found that the constant turning of the stamp so distributed the lubricant (pitch-pine tar) that there was practically no cutting. This was the first revolving stamp. We presently fitted the other four in the same way.

We found we had made a great improvement and our mill was soon attracting much attention. Revolving iron stamps were soon in use in various directions, and from that day to this only slight modifications have been made in them.

At this point I might close this paper, as, strictly speaking, Mr. E. G. Heard's question has been answered. The battery, however, as a whole has been greatly improved. I will give a list of the principal improvements:

1. *The Automatic Ore Feeder*—I applied for and received letters patent for an automatic feeder in 1858. My principal claim was for a lever regulated by a set-screw as and for the purpose described. This claim held for 21 years, the patents having been renewed in 1872, as provided by law at the date of that patent. This lever proved to be indespensable and is used on all ore-feeders in general use. Mr. Thomas A. Cochran, of Tuolumne county, was the most successful improver of the original device.

2. *The Gib Tappet.*—The late Mr. Zenas Wheeler, in 1862, then a mill manager at Gold Hill, Nev., improved the original tappet of 1852, calling the modification "the gib tappet." This was further improved by Messrs. Prescott, Scott & Co. (now the Union Iron Works) by casting the tappet with the gib in place and then boring all out together.

3. *The Latches and Billet of Wood.*—I had what answered to the latches, but the billet of wood placed between the faces of the tappet and cam as a ready and simple way of placing the stamps on the latches out of reach of the cams I did not discover. I would like to know the genius who first did that.

4. *The Mortar Block.*—This, as now made, is *set on end* and deep in the ground. Originally the mortar stood on timbers laid flatwise.

5. *The Mortar.*—A high mortar instead of a low one with sides built of wood.

6. *Tangent Cams.*—A good improvement.

The origin of the four last is unknown to the writer. Besides these there are some minor devices that a battery man would not be ready to spare, the origin of which cannot be traced.

I have made some effort to discover the origin of those shoes with square-tapered horns which I found in the deserted mill. I know the men who built the mill and also the firm that furnished the machinery and castings. But they have all passed away except Mr. E. T. Steen, of this city. He remembers the mill very well but does not remember any details. C. P. STANFORD.

THE somewhat enthusiastic statement is made by Colorado papers that "within two years the Cripple Creek district will produce more than one-third of all the gold mined in the United States. It will produce this year over $2,500,000, and work has scarcely begun yet. Next year, without railroads, it will produce at least $6,000,000. In 1895, with railroads, it is said to be a conservative estimate to say the output will reach $10,000,000." It is easy to multiply figures. While there is much activity at Cripple Creek just now, it is not a sure thing that it will continue to grow for several years to come. Booms sometimes hurst. We do not mean to infer that Cripple Creek is not a paying gold region, for it is; but it is not as big, rich or as certain as California, which is the only State in the Union that produces more than $10,000,000 in gold per annum, and we think it will continue to be for some time; and, further, that its actual gold production will increase more rapidly than any other State.

The Mineral Lands.

TO THE EDITOR:—No event in the history of the world, so insignificant in itself, ever created such a degree of excitement, was so productive of great and far-reaching results, and started people on the trot from all portions of the habitable globe, as the finding of a small piece of gold in California. Occurring at a time when a spirit of speculation and adventure was rife, great impetus was given to the boom. It was gold that everybody sought. It was scattered far and wide all over the country, and wherever found it was on mineral land. The pioneers, or "sooners," can well remember the long trains of big teams that lined the roads from Stockton, Sacramento and Marysville, all loaded with mining implements and supplies of Chili flour and beans destined to the mines, to be exchanged for the gold that the workers on the mineral lands were digging out.

Later on, the little two-horse teams were seen, loaded with garden truck, the owners gee-hawing their way to the mines for gold. In time this "infant industry"—the cultivation of a patch of a few acres—grew to giant proportions of agriculture, which in turn required machinery and flouring mills to prepare the product for use. Thus one branch of industry is developed to supply the requirements of others. Everything seems to have been developed on the fly. The old stage-coach and ox team were too slow to keep pace with the spirit of the age. The great railroad system was developed to meet the requirements. Everything and everybody seem to have got to going so fast that they jumped the straight and narrow track and got on to the broad and crooked road, lost sight of their starting point and now don't know just where they are at. The vast grain fields and products of the soil have driven Chili flour and beans from the land. The outside world is now the market instead of the mines. The palace car has sidetracked the old stage-coach and mud wagon. Steam and the freight car have turned the ox teams out to grass. These great changes, and the prosperity and success consequent, seem to have induced a false idea of independence, and with some developed a spirit of antagonism against (as it were) the author of their existence.

Amid all the changes, one thing remains unchanged: the allurement, the desire for gold. The rancher, the merchant, the manufacturer, and those in other lines of business, may think they are independent of the mines, and that they can get the twenty-dollar pieces from the East and from Europe. A close observer of events sees the old miners packing their sacks of gold-dust and gold bars to the mints. The twenty-dollar pieces go and come, and wherever found in any part of the world no one doubts but they are the product of the mineral lands.

The gold and silver mines may be compared to the motive power—the main driving wheel that sets in motion and keeps in operation the great machinery of finance, commerce, manufactures, and all other kinds of business and trades. Where the prosperity and progress of everything is so dependent on the mines, a wise and liberal policy in regard to the mineral lands is obvious.

Two periods are recognized with reference to the methods and regulations observed in regard to the mines. The first period embraces the time from the discovery to about 1870, when Congress commenced experimenting at long range with the mining laws. The second period extends from that time to the present. But few of the early miners, or "sooners," who controlled the policy of the first period knew anything about mining or mineral lands. The history of events shows that they were observing, practical workers, and soon acquired a knowledge of conditions and adopted regulations to suit. They made and executed their own laws relating to possession and working the mines. The laws were liberal and just. There was no conflict. From the surface indications and surroundings they formed pretty correct ideas in regard to the formation and character of the deposits, and, from a brief, successful experience in California, adventurous prospectors started out to explore and prospect other portions of the world. The result was the discovery of the gold mines in Australia, British Columbia, Africa and Alaska. In all parts of the world where gold and silver mines are being extensively and successfully worked, California miners are prominent in their management and working.

The great success and progress of mining in California during the first period was due, in a great measure, to the wise, liberal and just policy that controlled. It is the observing, practical mine-worker who knows just what the miners need, just what policy is best calculated to encourage the discovery and development of the mineral resources of the country, and just what should be designated as mineral land. The second period was inaugurated by an Act of Congress, passed in the interest and through the influence of a monopoly, to get title from the Government to a large tract of mining ground, thereby shutting out individual prospectors—the discoverers of all the mines. The law starts out on broad and correct lines, and if it stopped and got off at the right place it would be all right.

All will agree that it is a wise and liberal provision wherein the declaration is made that "All valuable mineral lands belonging to the United States are declared to be free and open to occupation and exploration * * * by citizens of the United States." But a wide difference of opinion and interests would spring up if a proposition is made to repeal that portion of the law giving the right to purchase the mineral land. So far as I know, no Government relinquishes its right to and control of its mineral lands except the United States. We might adopt the internal policy of other Governments in some things without any sacrifice of principles and but a small degree of independence.

The question of greatest importance to settle first is, What should be designated as mineral land? This should have been definitely and permanently settled by the Government long ago on a sensible and just basis.

There should be but two classes of lands recognized in the mining States and Territories. What is not clearly established to be agricultural land capable of cultivation should be considered mineral. On a rough estimate, leaving out the larger valleys and deserts, four-fifths of the land west of the Rocky mountains is mineral land. If any traces of valuable mineral are found on land unfit for cultivation, it should be considered mineral land, and its value as such can be determined only by prospecting and development.

The decisions and rulings of this second period are inconsistent and absurd in requiring proof of a rich-paying mine on the land to establish its mineral character. On this false assumption, carry the theory back 50 years and there would be no mineral land in the richest mining country in the world. Looking forward 50 years, what wise judge or learned secretary can tell where the rich mines of the country will be?

In regard to the control of the mineral lands, there should be an unconditional reservation of the mineral in all the lands in the mining States and Territories that are not clearly agricultural. The policy of disposing of the mineral lands has brought about a condition of things that would be difficult to remedy now. A great portion of the mineral lands have been given to railroad companies. It is true there is a reservation of the mineral in the grant, but it is nullified by decisions of the courts. Large tracts of mineral land are sold to lumber companies without any reservation. Trusts and combinations are formed to get possession and patent to large tracts of the mineral lands. The dominant idea of exclusive ownership of all that is in sight seems to prevail. The whole system, if it can be called a system, in regard to the control of the mines and mineral lands needs to be reconstructed. A move in the right direction will be to establish a department of mining, with competent mining men who have a thorough knowledge of the true conditions and requirements of the mining industry to control. The mining laws should be revised by competent miners. The mining districts should be enlarged to suit the conditions and convenience, with a Government surveyor to each district, whose duty would be to keep a record of locations and mines in his district and map the same and make a report at stated times to the head of the Department of Mining.

The Government should never relinquish its right to the control of the mineral lands by making grants or issuing patents for mining claims. I am aware that this proposition would arouse bitter opposition with a *class of large miners*, but would be endorsed by a *large class* of small ones.

It may be contended that capital would not invest the large amount of money required to develop and work the large mines without obtaining a patent to the land. An Act of Congress would make claimants just as secure in their holdings as a patent, so long as they complied with the conditions.

There are large tracts of mineral land patented, where the claimants neither work nor prospect them, or permit others to do so.

A liberal policy should be pursued to induce and encourage the discovery of new mines. But the much-needed gold should not be locked up in the mineral lands by a patent. J. F. TALBOTT.

IT has been discovered that the holes often observed to appear in marble which has remained for a period in sea water are caused by an insect.

Mechanical Progress.

Things to Remember about Shafting.

Don't buy light hangers and think that they will do well enough, when your own judgment tells you that they will spring.

Remember that shafting is turned one-sixteenth inch smaller than the normal size.

Cold-rolled and hot-rolled shafting can be obtained the full size.

The sizes of shafting vary by qnarter inches up to 3½ inches.

For line shafts never use any that are smaller than 1 11-16 inches in diameter, as the smallest diameters are not strong enough to withstand the strain of the belts without springing.

The economical speed of shafting for machine-shops has been found to be from 125 to 150 revolutions per minute, and for woodworking shops from 200 to 300 revolutions.

A jack-shaft is a shaft that is used to receive tbe entire power direct from the engine or other motor, which it delivers to the various main shafts.

Keep the shaftings well lined up at all times, and tbis will ward off a break-down and avoid a waste of power.

Know that the pulleys are well balanced before they are put in position, as a pulley much out of balance is quite a sure method to throw shafting out of line.

Look to the pulleys, and see that they have been bored to the size of the sbaft, for unless this is done, the pulley may be out of center on the shaft and prevent smootb running.

If possible, apply the power to a line of shafting at or near the center of its length, as this will enable you to use the lightest possible weight of shafting.

Hangers with adjustable boxes will be found to be the most convenient for keeping the shafting in line.

Keep your drip-cups cleaned, and do not allow them to overflow or get loose.

Have a supply of tallow in the boxes; in case of accidental heating, it will melt and prevent cutting. This rule, while good for general use, applies particularly to special cases where there is a supposed liability to heating.

Never lay tools or other things on belts that are standing still, for they may be forgotten and cause a break-down when the machinery is started.

Don't attempt to run a sbaft in a box that is too large or ton small, as you will waste time and fail to secure good results.

A loose collar held by a set screw will cause the collar to stand askew, and it will cut and wear the box against which it runs.

In erecting a line of shafting, the largest sections should be placed at the point where the power is applied. The diameter can then be gradually decreased toward the extremities remote from this point.

Don't put loose bolts in plate couplings, as this will give no end of trouble in cutting, shearing and tbe wearing away of the bolt boles.

Don't think that because your shafting has been well erected, and you oil it regularly, that it will never need any inspection or repairs.

Don't try to economize in first cost by having long distances between hangers, for a well-supported shaft will always do the best work; short shafts are the surest to be straight and to remaio so.

The length usually adapted to shafting bearings is two to four times the diameter of the shaft, varying with the diameters of shaft, kind of bearings and the material used in them. Large shafts in the gun metal or bronze boxes may have beariogs only twice their diameter in length. Cast-iron bearings up to and including three-inch shafts are often made four diameters of the shaft in length, particularly for self-adjusting hangers.

If babbit is used for the boxes, use only a good metal; do not adopt the common mixture of tin, antimony and lead.

Insist upon having good iron in your sbafting, as tbe bearings will take a finer polish, and you will not be subject to sudden ruptures.

If the strain on a pulley is so great that the set screws already in will not hold it, do not let them score in the shaft, but put in an extra screw, or cut a key-way and put in a key.

The width of a key-way should be one-quarter of an inch for eacb inch of diameter of the shaft.

The depth of the key-way is one-half its width. —American Engineer.

New Small Arm for the Navy.

A Washington dispatcb says: The adoption by the army of a new magazine rifle, to displace the rifles with which it has been armed for years, is to be followed by the selection of a new arm for the navy.

The Small Arms Board, which for weeks has been discussing the caliber of gun best adapted for naval purposes, has concluded that the army 30-caliber is not the gun for the navy, and has recommended a rifle of the remarkably small caliber of six millimeters, or of about 23½ caliber. The report of the board was approved by the Chief of Ordnance and forwarded to the Secretary. He has just approved it. The Ordnance Bureau will now begin the manufacture of rifle barrels of this caliber, and will call upon inventors of the country to submit their inventions of breecb mechanism and stocks to suit this caliber.

The adoption by the army of an arm of foreign invention will not control the navy, if it be possible to secure a rifle of domestic invention and having every feature of value which the mechanism of the army gun possesses. The board, in determining upon the caliber, was influenced by the greater value to the service of a gun with smaller caliber than that of the army, rather than by the advantages of having the rifles of identical size, with a view to the use of interchangeable ammunition. This advantage was not overlooked, but it was decided that the occasions for the use of interchangeable ammunition were so rare as not to warrant sacrificing wbat the board thought was a superior type of gun.

The board finds that the smaller caliber rifle has many advantages over the Krag-Jorgensen gun of the army, which is of 30 caliber. These are: Flatter trajectory, which will do away with sights; greater velocity and necessarily greater range; lighter ammunition and greater accuracy. Some barrels for test at the ordnance shops here are now being manufactured of this caliber. The bureau will also experiment with a barrel manufactured of steel, with 25 per cent of nickel.

Under the plans of the department the navy will furnish the barrels and ammunition, and the inventor who shows the best breech mechanism will supply the stock and all other parts.

Fully 5000 rifles are necessary to supply the enlisted force of the navy.

Knife Edges for Balances.

Most people would imagine that a knife edge working on a plane would give all the accuracy needed for pendulums and balances; but students are aware that there is still friction. In a German technical serial Herr Hasemann has referred to this subject, and offers a suggestion which may prove of value to makers of very delicate instruments. Herr Hasemann proposes to rest the knife edge upon another, or, rather, to give both the knife edge and its support a semi-cylindrical form. In that case the junction of the two surfaces is a plane, and for the same angle of the swing displacement of the surface of contact is much smaller. In the experiments undertaken to test this arrangement, the difficulty anticipated with regard to stability was found to be very much less than one might he led to think.

A Great Bridge.

A proposal is afoot for bnilding an immense hridge over the Mersey to connect Liverpool with Birkenbead. According to descriptions in the Liverpool newspapers, the bridge will be of the arched suspension type, in three spans, the roadway being suspended from an arch instead of the usual chain. Each span will have a clear waterway of 1100 feet, tbe center span having a clear beadway of 150 feet above high water of ordinary spring tides. The designs of the structure have already been completed.

Scientific Progress.

Proposed Sixty-three Mile Light.

A remarkable instance of scientific development in the matter of reachiog lights has been brought to the attention of the Uoited States Lighthouse Board at the Treasury Department by the reception from France of a pamphlet describing a new light to be erected on a lighthouse off the coast of Britanny. The lighthouse will be built on Penmarch Point, and will be known as the Eckmukl Lighthouse. It will contain an electric light of 40,000,000-candle power, casting a beam which can be seen at a distance in clear weather of 63 miles, and in foggy weather a distance of 21 miles. The highest order of lighting in the United States lighthouse service can only be seen 21 miles in clear weather. The light on the Eckmukl Lighthouse is of the "lightning-flash" order. At the usual height of ordinary lighthouse towers its ligbt cannot actually be cast more than 25 miles before it strikes the horizon, but beyond that point it is reflected in the sky for 28 miles. This light is most powerful, searching and penetrating, and is erected at a cost of about $60,000.

Device to Prevent Collisions.

To prevent collisions between railway traios, a Frenchman, Prof. Pellat, has invented a machine by means of which every locomotive on the road registers its position electrically every so often on a scroll of paper at the central office. The scroll is kept slowly moving over a cylinder. Electric contacts are made between points above and below it, which decompose some iodide of potassium in the paper and thus cause a blue stain. This happens every time an engine passes over certain levers arranged beside the truck at intervals of a mile, more or less. By watching the scroll a train dispatcher can see in an instant wbere every train is, and if any two of them approach too closely be can stop any engine at the next post telegraphically. An electric signal may be picked up by the locomotive with a "brush" on one of the wheels when it touches tbe registering fixture.

To Ascertain Loss of Head.

A "computer" bas been invented by the editor of the *Compass*, which enables the loss of bead of any pipe from 1 to 100 inches, and from 100 to 10,000 feet long, with any velocity of from 1 to 15 feet per second, to be read at once. The instrument, which consists of a dial and a revolving disk, will also, it is said, guide the discharge in cnbic feet per second for any velocity and diameter of pipes.

Practical Use for the Krytophane.

The remarkable instrument invented a few years ago and known as the "krytophane," is said by a French journal to have been recently perfected to such a degree that it is now regarded as promising successful practical results. In the construction of this peculiar apparatus a very sensitive receiving diaphragm is so disposed that it will respond to and transmit air vibrations produced by any noise to a distant telephone, the attention of the attendant being attracted by an alarm bell provided at the receiving station.

Scientific Facts.

Clonds are on an average about 500 yards in thickness.

The largest apes bave only 16 ounces of brain; the lowest men have 39.

All the glaciers in the Alps would not equal one of the largest in our Territory of Alaska.

The amount of air that a man will inhale in 24 hours will fill 78 hogsheads and weigh 53 pounds.

A scientist who has investigated the matter states that the men who are employed in the Paris sewers are as healtby as the average person, and no other 800 men in that city are so free from zymotic diseases.

The bluebottle fly discharges a not unimportant duty as a natural scavenger. Its larvæ of maggots must devour large quantities of putrefying and decaying matter, and must, therefore, remove from the earth's surface much material offensive, if not disease-producing, in its tendencies.

Dr. Ernest Hart of the British Medical Journal declares that cholera will become extinct in the next 30 years, because of the rapid advance of sanitary science.

Napbthaline, which is a product of coal tar distillation, in appearance something like parffin, has been found useful in England for the preservation of timber. The wood is soaked for two to twelve hours in the melted naphthaline at a temperature of obout 200° F.

Differences in Thermometers.

It is pointed out as a curious fact by M. Renou in his "History of the Thermometer" that the English employ the system of Fahrenheit, a Dane; the French that of Celsius, a Swede; the Germans that of Reaumur. To complete this paradox, it is observed by a contemporary that the Fahrenheit system was defined by Hanow, that of Celsius, perhaps, by Christin, and, finally, that originally the Reaumur thermometers marked a point in the neighborhood of 100 degrees, and sometimes higher, for the temperature of boiling water. In fact, Fahrenheit graduated his thermometers by making 0 degree at the lowest temperature of winter and 24 degrees on exposing the instrument to the sun. His degrees were divided into four parts at a later period.

Early Chinese Civilization.

After making full allowance for the Chinese natural talent for exaggeration, Dr. Brewer, of Cambridge, allows them to have been acquainted with the properties of the magnetic needle B. C. 1715; while the early French Jesuit priests, who had no interest in supporting mythical stories in the land of their adoption, believe trade routes and canals to have been in existence about the same period; that a system of regular marriages had been introduced among the people; that weaving was understood; banks, bank notes and gunpowder were in existence; a regular calender was reformed B. C. 1498; a knowledge of lunar eclipses evinced and the people divided into classes, distinguished from each other by different colored dresses.

Delicate Rain Gauge.

Professor Marvin, of the United States Weather Bureau, at Washington, has invented a rain gauge so delicate that it will measure the one-thousandth part of an inch of moisture. It is self-registering, moreover. Chief Harrington has distributed several of these instruments among observers in various parts of the country.

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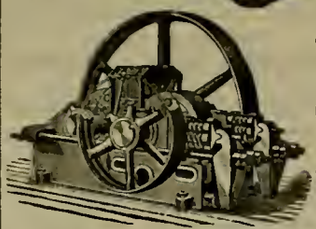

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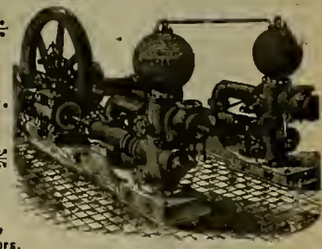

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Electricity.

Electric Development Since 1876.

How rapid the development of the electrical arts has been within the past few years may be seen by comparing the electrical exhibits at the Centennial Exhibition in Philadelphia in 1876 with those at the Columbian Exposition, now at Chicago, says Prof. A. E. Dolbear in the *Cosmopolitan*. Then electrical apparatus consisted mostly of telegraphic devices, galvanic batteries, static machines, Leyden jars, etc., for school illustrations and measuring instrnments, such as galvanometers and resistance coils. There were a few crude dynamos and one small imported gramme machine, none of them intended to maintain more than one arc light. Now there ls a rivalry for space in which to exhibit dynamos capable of lighting 60 or more in one circuit. Then there was not a single incandescent lamp in the world. Now they are to be seen by the tens of thousands and with all degrees of brightness, from that of a tallow dip to those bnt little inferior to the arc itself, and every exhibit is thus lighted. Then there was not a single electrical motor that was more than a toy to be run by a galvanic cell. Now motors for all kinds of service, from driving a fan to those running printing presses, looms, machine shops and threatening the existence of the locomotive itself.

Then all welding was done by hammering at the forge. Now electrlcity heats the ends to be joined, and, in less time than it takes to describe the process, heavy shafts and rails may be welded even better than was possible before. Then it was not possible to weld steel or other metals than iron. Now almost any metal can be electrically welded to another as easily as iron to iron. Then there were induction coils for producing sparks a few inches long. Now such sparks have been made five feet long, and it is believed could be made 50 feet long if it were worth the while. Then induction coils were employed for changing low potentials to higher. Now the transformer reverses the process and makes electric lighting feasible miles away from the dynamo. Then it was possible to send but two telegraphic messages in opposite directions simultaneously. Now 72 messages can be sent, 36 in each direction, on one wire wlthout interference. Then the telephone was first exhitited on a line the length of a building. Now one can talk with another a thousand miles away.

Then it was believed that a continuous condnctor was essential for doing any kind of electrical work. Now it is shown that all kinds of such work may be done without material connections. Then it was thought that llght was one of the physical forces. Now it is believed that light is an electromagnetic wave. Then it was believed and taught that electricity could never be economically employed for driving machinery, and that its light could not be subdivided. Now it is believed that electricity is in its infancy. Then all the electrical exhibit could be put in a space 50 feet square. Now a huge building, covering acres, is found insufficient for the needs of exhibitors. All this since 1876.

A Frolic of Lightning.

A singular freak of lightning is reported in the vineyard of Mount St. Mary's College, near Emmitsburg, Md. The lightning first struck a tree and killed it; the apples hanging on the tree withered. It then passed to the roots of the tree and tore up the ground as if it had been plowed for a distance of about 20 feet. It then struck the end post of a grape arbor, knocking a large piece of the post that supported the vines a distance of 40 feet. It then ran along the lower wire that supports the vines, about 200 feet, to the opposite end of the grape arbor, where it pulled out the staple which was attached to the post, knocking a piece out of that post also. On the way, the grapes that hung near the wire were injured, so that they withered on the stem. The grapes that hung higher up were less damaged. The same effect, in a less degree, was produced on two adjacent arbors running parallel to the one just mentioned, one on each side of it, at a distance of about 30 feet.

An Electric Fire Engine.

F. H. Wheelock, engineer of the Franklin school, of St. Paul, Minn., has exhibited to the St. Paul Board of Fire Commissioners an electric fire engine, and he offers to the city the free use of a system which he has invented, which involves the substitution of electricity as the motive power for all steam fire engines, and a large reduction in the cost of operating the department. Mr. Wheelock, in describing his electric engine, said one of its chief merits is its light weight and high power as compared with the steam engines at present in use. The steamers weigh from 9000 to 9900 pounds and are 18-horse power, while the electric engine weighs but 4500 pounds and is 100-horse power, which could easily be doubled if needed. The heavy boiler and machinery is done away with, and one man and one horse would be dispensed with for each engine, and the city would not have to purchase 400 tons of hard coal for the department, as at present.

To use the electric fire engines, the city would have to put in an electric plant consisting of two 300-horse power dynamos, one of which would be held in reserve in case of accidents. A wire to carry the current with connections to each hydrant wonld have to be laid. When the first cost of this had been paid, and Mr. Wheelock says it would be inconsiderable, the expense of maintaining the fire department would be very materially reduced.

Increasing Towing Power.

On some of the French waterconrses a system of chain haulage has been adopted to assist steam tugs in towing barges up the river against the stream. Briefly, the chain, which is fastened at each end, lies at the bottom of the river. It passes between guides at the stern or bow of the tug, over rollers and guides, and round nearly the whole of the circumference of the haulage pulley or drum, which ls driven by gearing from the engines. Leaving this pulley the chain passes over a similar series of rollers between breaking pulleys, and then is permitted to fall again into the river. With a vlew to increase the speed of the tug, a system of magnetic adhesion has been devised by M. Bovet, and has recently been tested on the Seine. It consists essentially in combining in the haulage pulley a magnet, the upper sides of the groove forming powerful pole pieces, which are short circuited when the chain engages in the groove. By this means the pull on the chain and therefore the speed of the boat are increased. One of the towing companies on the Seine is said to have adopted this system.—Exchange.

Electric Mining Plant.

An extensive electric mining plant is being laid down for the Compagnie des Mines de Noeux, of the Pas-de-Calais. The generating plant comprises two dynamos, and current will be transmitted a distance of two and three-quarters miles for the operation of five lifts, ranging ln power from 6-horse to 15-horse power. Five pumps will be driven by electric motors, and a tramway 1.24 mlles long will be worked electrically, each train consisting of 25 wagons. In addition to these applications, arc and incandescent lamps will be used for lighting purposes.

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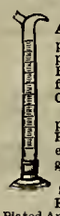

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Useful Information.

Mineral Statistical Column.

At one end of the main alsle of the Mining Building at the World's Fair stands a column of minerals that furnishes the public with a comparison of the bulk of the minerals produced in this country in each second of time. It was designed and erected by Dr. David T. Day, chief of the Division of Mining Statistics and Technology of the United States Geological Survey. In the following table the blocks of the column are represented by numbers, and the size of each block in cubic feet or cubic inches will be found in the column at the right. In the original column the petroleum production is represented by a heavy glass tank filled with crude petrolenm. Natural gas is shown by a block cut to proper size. The other minerals are shown in their natural state:

TABLE SHOWING COMPARATIVE AMOUNT OF EACH MINERAL PRODUCED IN THE UNITED STATES DURING EACH SECOND OF TIME.

No.	Mineral.	Length of each side of cube.	
1.	Bitumioous Coal	4.5	feet.
2.	Anthracite Coal	3.25	feet.
3.	Natural Gas	2.25	feet.
4.	Petroleum	2.1	feet.
5.	Limestooe	2.04	feet.
6.	Iroo Ore	1.5	feet.
7.	Graoite	1.25	feet.
8.	Cemeot	1.0	feet.
9.	Sali	10.5	inches.
10.	Sandstooe	8.75	inches.
11.	Phosphate Rock	7.0	inches.
12.	Bluestone	6.5	ioches.
13.	Potters' Clay	6.5	ioches.
14.	Marble	5.75	inches.
15.	Gypsum	5.5	ioches.
16.	Marls	5.37	ioches.
17.	Mioeral Waters	5.1	inches.
18.	Asphaltum	4.1	inches.
19.	Slate	4.0	ioches.
20.	Grindstones	4.0	ioches.
21.	Pyrites	3.5	ioches.
22.	Fibrous Talc	3.2	inches.
23.	Lead	3.13	ioches.
24.	Copper	3.0	inches.
25.	Mioeral Paiots	2.8	ioches.
26.	Zioc	2.62	ioches.
27.	Baryies	2.37	inches.
28.	Soapstooe	2.29	ioches.
29.	Ftiot	2.25	ioches.
30.	Maoganese Ore	2.18	ioches.
31.	Borax	1.9	ioches.
32.	Feldspar	1.9	ioches.
33.	Fluorspar	1.79	ioches.
34.	Iofusorial Earth	1.5	ioches.
35.	Chromic Iron Ore	1.15	ioches.
36.	Corundum	1.01	ioches.
37.	Sulphur	1.01	ioches.
38.	Millstooes	.88	ioches.
39.	Novaculite	.77	ioches.
40.	Silver	.74	inches.
41.	Ozocerite	.70	ioches.
42.	Quicksilver	.47	inches.
43.	Bromioe	.47	inches.
44.	Graphite	.46	ioches.
45.	Aotimooy	.4	ioches.
46.	Alumioum	.35	ioches.
47.	Asbestos	.33	inches.
48.	Nickel	.28	inches.
49.	Mica	.27	ioches.
50.	Tio	.25	ioches.
51.	Gold	.177	ioches.
52.	Cobalt Oxide	.096	inches.
53.	Precious Stooes	.09	ioches.
54.	Rutile	.0576	graios.
55.	Platinum	.009	graios.

Cure for Snake Bites.

E. F. De Celis of Mexico writes the following to the *Scientific American:* From time to time I see in the papers recipes for curing the bites of polsonous snakes, recommended by medical and other people. In California, where I come from, we have occasion at times to treat animals for the bite of the deadly rattlesnake. I have seen two kinds of herbs used; one is called in Spanish "la golondrina" (the swallow), growing in the most arid plains; the other is the rattlesnake weed. Both are very effective, but it is not every one who can tell them, even when at hand. What I know from my own experience to be an infallible cure is the gall of the snake itself. One drop of it on the wound will effect a cure, even when inflammation is far advanced. I have seen a dog treated whose head had already swollen to twice its natural size, and it cured him almost instantaneously. The gall may be preserved in alcohol, or even dried, requiring in the latter case only to be moistened; even saliva alone between two stones will do. I have seen a case of this kind. If preserved in alcohol, of course, the whole bag of the gall is put into the liquid entire. If true of the rattlesnake, and, as I said before, I know it is infallible from my own experience, it is probably true of all other poisonous snakes, and might it not be true in the case of the rables that the gall of the animal would cure the bite?

When at college, in London, the teacher in French, who had been a Spahis in Algiers, assured me that the Arabs cured the sting of the scorpion by mashing the scorpion and applying it as a poultice on the wound. This I have never seeo tried, however.

Recipe for Painters.

White paint for metallic surfaces. A very common drawback to the use of white paint is that on exposure to heat, and especially to gas flames, lamp shades, cellings, etc., painted with oil colors, it soon turns brown, owing to the calcination of the organic matter contained in the colors, and the linseed oil in the oil paints, says the *Journal of Building*. A British exchange gives the following recipe to procure a durable white color: Take some fine zinc white and mix it to a suitable consistency with a solution of protoxide of sodium, and water glass of 40 to 50 degrees B. The surfaces to be painted must be thoroughly cleansed, and for certain metals, such as zinc, must be washed off with hydrochloric acid. Now cleanse the surface with water, and lay on several coats of this zinc water-glass paint until the article is deemed sufficiently covered. A pause should be made between each coat, but not of any long duration, as this paint soon dries. If a large surface, such as a ceiling, has to be covered, too much paint should not be mixed, as the chemical action of water glass on zinc white is to render it soon thick and hard. This paint is not affected by excessive heat, and always remains snowy white, only being affected by dust and soot. It never scales, and beats all other oil paints on the score of beauty, durability and whiteness. It may also be tinted to taste by the addition of other mineral colors.

New Process of Galvanizing.

Among the recent experimental processes with iron and other metals is a new process of galvanizing, which would appear to have some advantages over the older method of steeping articles in molten zinc, the claim being that by cold galvanizing a more uniform coating is obtained, and, in the case of wire, the tensile strength is not diminished, says the Chicago *Journal of Commerce*. Comparative tests of the hardness of the coating on iron sheets show that the plate thus galvanized has a somewhat harder surface than that obtained by the usual means. An equally interesting result of recent investigations is the successful coating of metal surfaces with glass, in which operation there are melted together about 125 parts, by weight, of ordinary flint glass fragments, 29 parts carbonate of sodium and 12 parts of boric acid. The fused mass is poured out upon some cold surface, as of stone or metal, and pulverized when cool; then of this mixture a powder is made with silicate of soda, water, glass—solution 60 degrees Baume—and with this coat the metal is glazed, being heated in a muffle or other furnace until it has arrived at the requisite fusion. This coating is represented as adhering firmly to steel or iron.

Lew Wallace's Royalties.

The presence of Gen. Lew Wallace in the city has revived gossip in literary circles about the royalties he received from "Ben Hur." One of those connected with the Harpers' house said recently that at the last settlement Wallace was shown to have received nearly $140,000 in royalties for that book. If that is so, it is the largest sum ever earned by a romancer, at least by an American.—Philadelphia Press.

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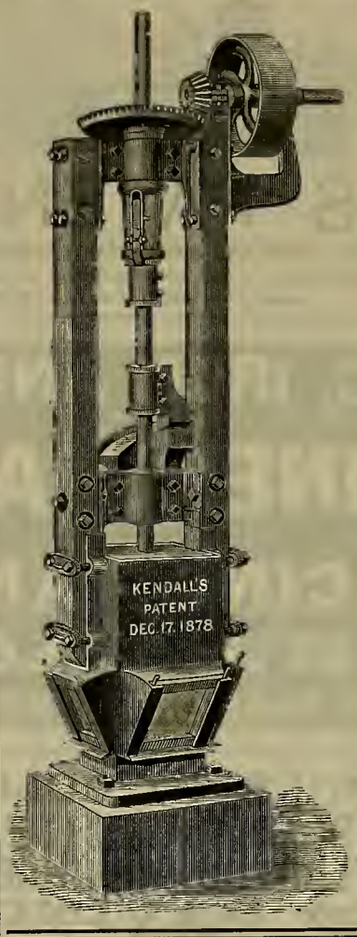

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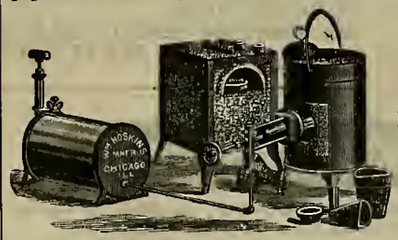

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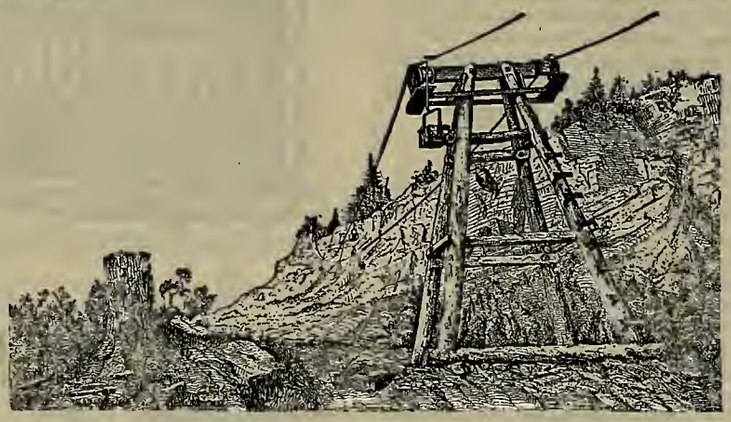

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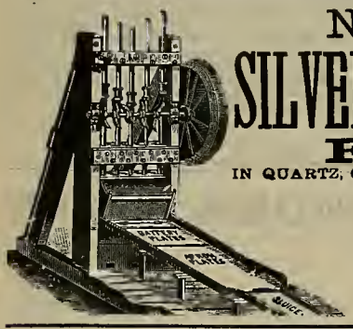

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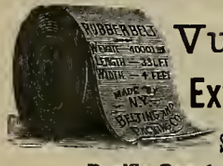

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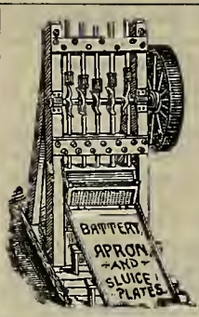

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Coast Industrial Notes.

—The Union Pacific Railroad has been placed in the hands of a receiver.

—The ferry war on the San Francisco-Oakland route has reached such a pass that the fare to Oakland by the creek route is now 2½ cents.

—The National Electric Tramway Company has authorized a loan of £70,000 for the purpose of extending and improving the service in Victoria, B. C.

—A London cable says it is now expected that the prices of furs, especially for the fur seal, bear, marten and mink, will suffer a decline unless business shows an improvement.

—Half the standing grain in the Palouse Valley, Wash., is ruined by the heavy rains, which means at the very least 3,000,000 bushels. Many farmers have turned their stock upon the fields.

—If the plans now being formulated by Henry P. Taylor, Nichaus Bros. and others, are carried out, there will soon be a line of ferry steamers plying between San Francisco and West Berkeley.

—Kern county has decided to issue $250,000 worth of general-improvement bonds. The money is to be expended on a public building in Bakersfield and on the highways leading to the county seat.

—C. H. Dodd, a dealer in agricultural implements, with headquarters at Portland, Or., has closed his houses in Colfax, Pullman and Garfield, Wash. The recent rains have killed the implement business in those sections.

—The Northern Pacific, Great Northern and Canadian Pacific have announced a $50.25 round-trip rate from western terminals to Chicago and $47.25 round-trip rate to St. Louis. Tickets will be sold until the 31st of October and will be good until November 18th.

—On Sunday, October 22d, the San Francisco and San Mateo Railroad Company will begin running cars regularly to Baden. The track-laying has been completed, the poles placed, and the stringing of the wires is now in progress and will be finished before the date mentioned.

—The Virginia and Truckee railroad shops have closed down. Nearly the whole force was laid off. The car shop, foundry and blacksmith shop were closed. Only three or four are employed in the machine shop. The shut-down is due to the inoperation of the mines on the Comstock.

—Stewart Meozies, representing a Scotch syndicate and owner of the Chow Chilla ranch, Merced county, is negotiating with the Fresno Canal and Irrigation Company for 1000 feet of water, to be delivered some 40 miles to the above ranch, for a consideration reported to be $200,000 or $300,000.

—The Baker Iron Works of Los Angeles and a San Francisco firm have taken out liens on the Bear Valley Company's canal in San Bernardino county, for which they furnished material. Ex-President Graham has headed a movement to reorganize the company, assigning mismanagement as the cause of the present trouble.

—The first piles used in the Government jetty at the mouth of San Diego harbor were driven Saturday, Oct. 14. The work of construction will be completed in a year, or perhaps less, with reasonably good fortune. After the driving of the piles is well started the work of sinking willow mattresses full of stone will proceed, reaching a width of 22 feet.

—Judge Fullerton of the Circuit Court at Corvallis, Or., has issued an order directing an unrestricted sale of the Oregon Pacific Railroad property by the sheriff on or before December 15th. The property is claimed by local papers to be worth $15,000,000, with $850,000 indebtedness. The road has been in operation about 12 years, and has had a checkered career.

—Surveyors have commenced work on an extension of the Pajaro Valley railroad from Watsonville to Corralitos, a distance of seven miles. The road will pass through some of the finest fruit and sugar-beet land in the Pajaro valley. It will be an extension of the line operated between Watsonville and Salinas, and will be managed by the Western Beet Sugar Company.

—The South American and West India Immigration and Development Company, to supply implements to the southern countries and carry on a general trading business, has incorporated with a capital stock of $50,000. The stockholders are Henry W. S. Emunds of Durham, England; and Geo. T. Goden, H. D. Kirkover Jr., R. B. Elden and George H. Benedict of San Francisco.

—Work has been commenced on the big chute for the American River Land and Improvement Company at Folsom. It will be 2900 feet long, and 1,250,000 feet of lumber will be used in its construction. The firm which is doing the work is under bonds to complete it by December 15th. The logs will be floated down the canal to Folsom, where they will go through a mill.

—In the Washington building at the World's Fair is exhibited the largest piece of wood-turning in the world. It is the work of J. L. Nygren of Tacoma. Mr. Nygren spent about three months of his time making a special lathe and turning from a single log of cedar a huge vase, six feet high and four feet across the top. The vase is highly polished, and shows to splendid advantage the color and graining of the red cedar.

—The J. C. Anthony Company has been incorporated for the purpose of selling and manufacturing drugs and medicines and establishing sanitariums for the care of the sick. The subscribed capital stock is $1,000,000, held as follows: W. E. Hale, prison warden at San Quentin, $250,000; J. C. Anthony, Vallejo, $125,000; Alex. T. Vogelsang, San Francisco, $125,000; W. H. Griswold, San Francisco, $250,000; O. I. Brown, San Francisco, $250,000.

—The firm of Huntington, Hopkins & Co. of this city, is getting its affairs in shape to retire from business. Half of its force of employes has already been discharged, the bar iron has been disposed of to George W. Gibbs & Co., and Crane & Co. have assumed charge of the plumbers' supply business, occupying a portion of the storeroom of the firm for that purpose. Miller, Sloss & Scott may take what is left, that firm having purchased the Sacramento branch of Huntington, Hopkins & Co. some months ago.

—At the recent annual meeting of the Nevada Bank of California, the usual reports were presented. From the report of President Hellman it appears that the following were the gross earnings for the year ending with the last day of last month: Interest, $317,688.38; commissions, $8283.34; exchange, $33,545.63; total, $359,517.35. Deduct—Expenses, $96,164.63; taxes, etc, $10,250; total, $106,414.43; net profits for the year, $253,102.72; paid in dividends, $180,000. The bank has assets of $8,686,585.67.

—The total shipment of products from San Jose last week was 12,433,470 pounds. An enormous amount of dried prunes were shipped East, 3,621,755 pounds being sent. Of green fruits 1,277,855 pounds went East. Garden seed also went away in large quantities to the East and Europe, the total being 181,005 pounds. The total shipments of all dried and canned fruits and other products sent East was 6,299,245 pounds. The shipments to California points were 2,134,225 pounds.

—The San Gabriel Valley Rapid Transit Railway has passed into the hands of the Southern Pacific. The road is 20 miles long, and extends from Los Angeles to Monrovia, with a branch running from Shorb to the Raymond Hotel, on the outskirts of Pasadena. The Southern Pacific has been operating the road under a verbal contract for some time. It was formerly operated by the Los Angeles Terminal Company, and is a standard-gauge steam railway running through a beautiful section of country.

—The State Supreme Court has handed down its long expected decision in the mandamus case of Louis Jacobs against the San Francisco Board of Supervisors. It declares, in substance, that the Mayor of San Francisco has no right to veto an ordinance to fix water rates which the Board of Supervisors has by a majority vote adopted. The regulation of water rates is said to be something with which that officer has nothing to do. Accordingly, the water rate order adopted last March and vetoed by Mayor Ellert is valid, and has been in force from the beginning of the fiscal year which opened July 1st.

—The mileage of the San Francisco cable roads which have entered into the Market-street combine is given as follows:

	Miles.
Market-street Cable Company	13
Same, partly constructed and other lines	19
Market-street and Fairmount	1
City Railroad Company	8
Same, partly constructed and other lines	7
Potrero and Bay View	1
Southern Heights and Visitacion	2
Same, partly constructed and other lines	4
Park and Ocean	5
Ocean Beach	4
Central Railroad Company	7
Same, partly constructed and other lines	3
Omnibus Cable Company	26
Same, partly constructed, etc	8
North Beach and Mission	15
Same, partly constructed, etc	2
Ferries and Cliff House	16
Same, partly constructed, etc	11

—The much-discussed consolidation of the principal street railways of this city has finally taken place. The capital stock of the consolidated companies will be something over $18,000,000, and of this amount the Market-street system will get 76 per cent or about $13,500,000. Of the remaining $4,500,000 the Omnibus Company will secure two-thirds and the remaining one-third will go to the Ferries and Cliff House line. Included in the corporation are the Market-street cable system, Market-street and Fairmount, Park and Ocean Railroad, Potrero and Bay View, Southern Heights and Visitation Valley, City Railway Company, Central Railway Company, Omnibus Railway Company, North Beach and Mission and Ferries and Cliff House.

—The co-operative system adopted two months ago by the Auld Shingle Company, of Ballard, and its employes, has already been abandoned, as it was not working well, and the reduction of the scale of wages by the Shingle Weavers' Union has made it possible for the company to run on the old plan. The arrangement was that the employes should aid in other work besides their own special line and for a time they did this willingly, but it was not long before some began to complain that they were doing more than their share and objected to being taken away from their regular work to help in other ways. After returns were received on the product, the bill for shingle bolts was to be paid, then the manager's and bookkeeper's salaries, and out of the balance the workmen were to be paid the union scale. If there was anything left it was to be divided pro rata among all, the managers and employes. The company was to be paid 10 cents per 1000 shingles for the use of the mill. Two mills at Blaine, one at Tenino and one at Aberdeen were run on a similar system. When the Shingle Weavers' Union reduced the scale last Saturday the company gave notice of the abandonment of the co-operative scheme and returned to the old wage system.

Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

STRUCK RICH QUARTZ.—Amador *Ledger*, Oct. 13: W. A. Nevills, a former resident of Jackson, who has been developing and prospecting the Rawhide mine near Sonora for some time, recently struck a rich body of quartz.

The Alma people have secured a right of way for a road along the ridge from Kennedy Flat to the Lancha Plancha and Jackson road opposite their property. This will obviate the hard pull from Jackson to their mine and admit of their getting their machinery, lumber, etc., over the ridge road the same as the Kennedy does.

The Argonaut Mining Co. has from ten to twelve men at work on the site of their mine, grading down the hill for road purposes, and building roads to the property. They have arranged to leave the main road on Kennedy Flat and wind round the hill to the site of the mine, which is just this side of the Kennedy tramway, the road running thence to the Kennedy grade. The grading and road work will probably last a week longer, at which time the shaft will be commenced. There are now several teams engaged on wood and timber contracts, and they expect to have enough on the ground by the time the rains come to run during the winter. Arrangements have been made for a donkey engine which they intend to use during the first 500 feet of sinking.

Butte.

THE COLEMAN.—Oroville *Mercury*, Oct. 13: G. W. Price of Forbestown has let a contract for the erection of a new ten-stamp mill on a quartz ledge owned by him and known as the Colorado. The ledge is within a short distance of Forbestown, and development work has shown it to be extensive and rich, the ore running high in free gold. Mr. Price is to have his mill running inside of 60 days at the most.

To supply water to this and other mines in that vicinity, the Forbestown Ditch Company is now engaged in reconstructing an old line ditch, running to the north and west of Forbestown. The expense of this repair will be about $1000, and water can be supplied to several mines now being developed.

When this mill is completed there will be 90 stamps in operation in the Forbestown district.

Lassen.

GOLD FROM A NEW FIND.—Reno *Journal*: The Reno Reduction Works recently received a small lot of ore from B. H. Leavitt of Susanville, which turned out handsomely in gold with a small per cent of silver. The ore is from a new find south of Susanville near the foot of Diamond mountain. The ledge is large and well defined.

Nevada.

LADY BUYS A MINE.—Mrs. Ida Marion of Grass Valley, who is an owner in the Mount Charles mine in this district, has purchased a half interest in the 30-acre quartz claim on Red Hill, owned heretofore by H. Trevaskis, says the *Transcript*. She paid $3000 for the interest, which is considered a moderate figure by old miners acquainted with the property. The owners propose to commence the development of the claim soon.

GOOD PROSPECT.—It is said that the Spanish mine, recently purchased by Colgate & Co. of New York, promises to be among the leading mines in the Nevada district. According to measurements of the ledge opened up, and the assays of the rock, it is estimated that it will yield $70,000 to the new owners. That is only what is now in sight, says the *Transcript*.

THE FEDERAL LOAN.—*Transcript*, Oct. 16: The Federal Loan quartz mine, in Willow Valley district, about 2½ miles from Nevada City, is looking unusually well. They are still sinking, and where they are working now they have a six-foot ledge. The rock, good and hard, is all crushed as taken out, and it averages a little over $11 per ton. If only the good ore were taken out and crushed, it would give an average of $30 per ton. The company has a lot of sulphurets, which run from $80 to $90 per ton. The ten-stamp mill is kept running night and day, Sundays included. The Federal Loan is proving to be a big property.

A STRIKE.—Nevada *Transcript*, Oct. 16: A rich strike was made in the Mount Georga mine yesterday. Specimens of the quartz were brought to town to-day and shown to many of our citizens. The rock is filled with rich sulphurets and shows considerable free gold. The Mount Georga is located on Rush creek, about three miles west of this city. It is owned by Dr. W. O. Jones, John E. Carter of Grass Valley, Fred Zeitler of this city and others. The mine has been prospected for the past year or two, the indications met with encouraging the owners to keep on with the work. Mining men regard this strike as a very important one, for the reason that the Rush creek section was for a long time regarded as a poor quartz section. The results at the Mount Georga so far will tend to revive prospecting throughout that locality, as a number of ledges are known to exist there. The ledge at the Mount George is 2½ feet wide.

Placer.

MINES DOING WELL.—Colfax *Sentinel*, Oct. 13: The miners on the American river near Gold Run are still working and doing well.

The Morning Star mine at Iowa Hill has undergone considerable repairs during the past few weeks, and will soon be ready for work again. Besides a fine new stamp-mill, a great deal of the main tunnel has been retimbered.

Mr. Gould of Iowa Hill, who has been for a long time near Iowa Hill prospecting for the main channel, has at last struck it, and, like the rest of the channel on that divide, it prospects fine.

Sam McKinn and Paul Lavean of Alta recently bought part of Golden Eagle canyon, in which the tailings from the drift mine of H. Dreslar were dumped last year. They have been at work cleaning it up.

Messrs. Gould and Doolittle are pushing the tunnel at Gold Run. They are trying to find drift ground.

C. E. Gillette, who does most of the preliminary work of the Debris Commission, inspected the Liberty Hill dam in Bear river last week. This dam, in spite of Judge Sawyer's opinion, has stood the test for the past 12 years and now stands as firm as ever. If the dam should be raised, and a new wasteway made, it would be as solid as ever and prove an effective barrier to the tailings for many mines above it.

There is a probability of the Alta drift mine at Alta being worked again. This mine was worked several years ago, but, owing to litigation and other causes, was closed down, notwithstanding good paying gravel was being worked. The gravel in this mine is the same as in the Hidden Treasure at Sunny South, and no doubt will prove a good mine if worked again properly.

W. Rodger, who has had charge of the Dam claim belonging to Mr. Weske, recently struck what is supposed to be the Hidden Treasure lead. The main tunnel of the Dam claim has been pushed ahead of late in hopes of striking the blue lead which had run out. The Dam claim at one time was a good-paying mine, the gravel being of the blue lead. A few years ago it gave out. This blue lead intersected and cut off the white lead which paid so well in the old Mountain Gate mine at Damascos, and which is still paying well in the Hidden Treasure of Sunny South. The tunnel of the Dam claim last week was run into the gap between the Hidden Treasure and the Mountain Gate at about 80 feet lower than the channel of the Hidden Treasure. To the surprise of the owners of the Dam claim, some of the same character of gravel as is now being worked in the Hidden Treasure was struck. The tunnel was run about 15 feet into the white gravel, but, on a survey being made, it was found to be on the Hidden Treasure ground, so Mr. Weske abandoned the work. If it should prove that there is much of a body of gravel in the gap where none was supposed to be, it will prove a great find, as the gravel prospects very well. The tunnel of the Dam claim is in about 6000 feet, but, as there is no more paying ground in the blue lead through which it runs, it will be abandoned, unless the Hidden Treasure should find enough of the white lead in the gap to justify working through the Dam claim tunnel.

Plumas.

MINE LEASED.—*National-Bulletin*: Russell & Simmons have leased the Reece mine at Washington Hill, near Onion valley, and took a load of supplies there for the approaching winter. It is a gravel mine which, during the many years past, has yielded good returns. The lessees hope to be able to work quite a force of men next year.

Shasta.

THE INTEGRAL MINES.—Redding *Free Press*, Oct. 14: Prof. Archibald B. McCaw is at present shipping in supplies to the Integral for the winter, and has between 40 and 50 men em-

ployed. Besides the necessary supplies, he is also shipping a 50-horse powsr engine and boiler, a Cameron sink pnmp and hoisting works, some 30-inch pipe for condensers and other necessary macbinery. Three shifts of men will be employed iu sinking a 500-foot shaft on the Bostou and in making prepaiations to open up levels, etc. Tunnels are being pushed on the Temple and Del Norte claims. Already the company has shipped several hundred fiasks of qnicksilver. Several condensers are now being bnilt, which will be lined with cement to prevsut the escape of the silver. Unless due precautiou is taken, a great qnsntity of the metal escapes. To illustrate tbis fact: Iu cleaning out one of the smokestacks receutly, 36 flasks of quicksilver were recovered from tbe lining of wood inside where it had accnmulated. Mr. McCaw says that the company will uot only gnard against all leaks and losses, but will, with improved machinery and every means known, reduce the cost of its production, and tbus be prepared for the lowest market price of the prodnct.

As soou as the Altoona Company settle their difficulties—aud, by the way, the Intsgral own claims all around the Trinity aud Altoona claims, then the compauy will purchase the Altoona iuterests, and control the eutire quicksilver deposits of the district. Then, indeed, the outpnt will bs immense and au awakening influence will be felt in both Trinity and Sbasta couuties. Alexander McCaw, the superiutendeut, is at presant seeking to recrnit his energies iu British Columbia, but will eoon return refreshed and ready for bnsiness. Prof. McCaw will remaiu here until Alexander's return, wheu he will go to London on a vieit to his family.

LOCAL NOTES.—Shasta *Courier*, Oct. 11: Mr. P. Stolberg brought to thie office a aample of rock takeu from the mine ou Shurtleff Hill, just outside the town limits, which was as pretty a piece of rock as we have seeu for a long while. The ledge is owned by Messrs. Flick, Stolberg and Mauer, who have uo donbt got a regnlar bouanza ou their hande. They have pusbed the tunnel in a considerable distance and the ledge is over three feet wide and improving as the tunnel is advanced. An assay made by F. P. Satterlee from samples firet takeu ont, goee $51.67 per ton iu gold. A small force is working ou the ledge and the ownere iuteud to properly develop and work the mine, as they are fully able to do so.

Tbe Distlehorst dredger has been anchored ou the riffles between Middle creek and Reddiug for the past few weeke. The boye have made a big succese of the dredger so far and there is uo reasou why the river above should uot pay as well or better than the place where it formerly worked.

Johuny Early and Chas. Smith are rnuning an 800-foot tunuel ou the old Smith miue, a few miles from Frencb Gulch.

The Gladstone, which has laid off a considerable uumber of men, will employ a larger force thau ever when general operatious are resumed, and the battery capacity will be increased to the extent of teu stamps.

Sierra.

TO WOEK THE TAILINOS.—Sierra Valley *Leader*: Mr. J. W. Kerr of San Francisco wae throngb here this week ou his way to Sierra City. This gentlemau goes there for the pnrpose of working the tailings dump of the Young America mine. He and several other geutlemeu have made arrangements with the Youug America owners and they will commence work at once. They will put up a plant, which for the preseut will consist of four arrastras, and they will employ from ten to fourteen meu. There is estimated to be about 150,000 tons of tailings, which will all be put through the arrastras. What the valuatiou of these tailings ie would be hard to tell, but from another source we learned that they are estimated to be worth from four to six dollars a ton. Mr. Kerr will enperintend the works, and they will be well managed uuder hie eupervieion, ae he has had cousiderable experience in work of thie uature iu this country aud Mexico.

Siskiyou.

A RIOH FIELD.—Yreka *Journal*, October 11: Owing to the demoralization of the silver-miuing industry, iu which so much capital has beeu iuvested, the mining operators with meaus to invest are seeking gold-miuing properties, which are certaiu to be of permanent value, aud there is uo couuty iu this Golden State offering a more extensive field of success tban Siskiyon. Not only is the surface valuable for placer miuing in the way of groundsluicing, driftiug, hydraulic-piping, creek and river-bed working, etc., but all the mountains are loaded with rich qnartz veius, worked ou a small scale only, as yet. The opening of uew wagou roads into remote sections siuce the advent of the railroad, ie uow affordiug good opportnuity for transportation of heavy mining machinery aud apparatus, instead of relying only on pack mulee as heretofore; hence from uow on the gold product is likely to be much greater than ever before. New improvements in river mining are ueeded, also larger and better quartz mills, and other apparatus of ecientific uature for saving fine gold and separating it more successfully from the sulphurets. All these are gradually being introduced as our mines are developed, aud the time is uot far distaut, if not already present, when Siskiyon will stand at the head of all counties in this State as the champiou producer of gold.

Iu the Hnngry creek mines, in the Siskiyou foothills, J. L. Coyle has a promisiug ledge of quartz, from which he has already taken a large amount of ore, to be crnshed shortly in the mill near the Sterling mine. Mr. Coyle has let a contract to sink a shaft 50 feet down, which will develop the ledge to a great extent.

The Sterling mine, iu the same locality, aleo looks well, and is to be opened on au extensive scale, the amouut of quartz iu sight showing sufficient quantities to keep the mill busy for several years.

The Spsncer & Co. mine, in the Siskiyou foothills near Coles, has been shnt down temporarily, bnt the owners feel confident of being able to realize extensively whsu work can be continned. Some of the company lost heavily by the closing of banks dnring the panic of a couple of months ago bnt hope to be in condition for starting work again on the mine next spring.

NEVADA.

Peavine District.

THE GEAY EAGLE.—The Reno *Gazette* says: Mr. Atwood, the well-kuown mining expert, who is 83 years of age, was in Reno the other day, accompauied by Capt. W. F. Mills and D. Dickey, and visited the Gray Eagle mine ou Granite Hill, two miles uorth of Lemmon's miue. Mr. Atwood, who is working iu the intsrest of New York capitalists, prouounced tbe mine to be a very good piece of propsrty, and he said he had uo donbt it would prove very valnable if developed. He had three photographs taken, showing the miue and surrounding couutry from different points of view.

Young America District.

ROUTE TO BEUNEAU MINES.—The Winnemucca *Silver State* is requested to publish information as to the best wsy to reach the new Brnnean gold fields.—Virginia *Chronicle*. Elko is tbe nearest point ou tbe railroad, says the *Silver State*. There is a fine wagou road from Elko via Wayland's, Tncker's, Murphy's raucb, Mrs. Johnson's, Mr. Stofel's, Island mountain, and Hugh Martin'e to the snmmit immediately sonth of Brnnean river. This route leads to one of the uew mining districts on the river. To go to the lower district the road forks a few miles this eide of Island mountain and passes through Mountaiu City in the uorthern part of Elko county. To strike the Brnueau river at another district and in the vicinity of the middle fork of the Brnneau river, the town of Deeth ou the railroad above Elko is the proper place to leave the railroad.

A person going from any part of western Nevada by team or horseback, wonld follow up tbe Hnmboldt river to Winnemucca, thence to Paradise, thence to Tnscarora; or to Battle Mountain, tbence to Tnscarora. Tbere is uot much difference between the last three uamed routes. At Tnscarora tbey can be pnt on the beet route from there. The route from Tnscarora we are not acqnainted witb.

To go to the upper district or to the middle fork, the Deeth route ie the proper one. Tbe Elko ronte has the advautage of good accommodations at the ranches every ten to twelve miles after arriviug at Waylands, which is 23 miles from Elko.

THE NEW GOLD FIELD.—Alex Penrod writes the *Independent* from Island Mountain that he hae jnet returned from the Young America mining district in the Bruneau conntry and gives the following account of what he saw:

"Some very ricb prospecte have been strnck by the miners out there. There are some 22 claims already located which ebow up coarse gold in paying quantities. Water is very plentiful. About 500 inches rnu down the Brnneau river with a big fall.

"I was shown a bank of gravel over 280 feet high which showed a flattering prospect on top and that the gold must be very coarse on bedrock. A boulder, weighing about 20 pounds, found by Mr. Joseph Lang, shows gold all over it. The miners, working with pick and shovel, average about $1.25 per hour to the man. Ae soon as pipe and machinery are brought in, wbich will be soou, with plenty of water witb a big fall, Young America district will surely become a big gold producer."

Ferguson District.

GEEAT GOLD PEOPEETIES.—Pioche *Record*, Sept. 28: J. B. Stevens, mentioned last week as going to Fergusou district iu the interest of Sau Francisco parties, passed a few days iu the district, eampled some of the claims, uotably the Jim Crow and the Monitor, and set out on his returu to Sau Francisco ou Tnesday. He says if the ore body in the two named mines will average $20 a ton, one of the biggest gold properties in the couutry exists there; that he wonld have his samples carefnlly assayed, aud might return here again in a month, to remaiu about that length of time. Those who know the Jim Crow aud Monitor claims etate that, if the samplee were fairly taken, there is no doubt bnt that the assays will show au average value of more than $20.

Ely District.

THE YUBA.—Pioche *Record*, Sept. 28: Since closing the Yuba mine a few weeke ago, foul air has accnmulated so rapidly that it is impossible to get lower iu the shaft thau tbe 12th level. The work of couuecting this mine with the lower workiugs of the Old Mazeppa is being pushed from the 9tb level of the Old Meadow Valley shaft No. 3, through the Mazeppa workings, and is believed to have progressed almost far enough, 12 feet remaiuing yet to be rnn according to measurements taken. Soundinge from the west end of the 13th level, Yuba drift, would practically settle the matter conld they be made, and, should the work fail to connect withiu a few days, steps will be taken to rid the Yuba of its foul air, thongh this is uo email task, and prosecute the work again from that end.

ARIZONA.

MINES BONDED.—Tombstone *Epitaph*: The Dragoon monntains uear this city are now being accorded a merited share of attention from capitalists. The past week has witnessed the consummatiou of a boud ou the very promising group of copper mines situated thereiu and belonging to Mayor Fitts and Jas. Barrett. The amonut of the bond is stated to be $30,000. This gronp has alwaye been esteemed one of the best prospects iu Cochise county. The ore in sight runs from 6 to 60 per cent and the supply is inexhaustible.

Mr. Sketchley, who has beeu in Tombstone for some weeks, represents a substantial syndicate in London, whither he has jnst gone to submit his report on the property, which he has thoronghly experted. Tbe development of these mines and the erection of the contemplated smelter will give employment to a large number of now idle men in this city, and Mr. Sketchley's retnrn is impatiently awaited.

A RICH STEIKE.—Prescott *Journal-Miner*: A letter from tbe Old Reliable Gold Works says: "This quiet bnt bnsy camp has been vsry agreeably surprised by a rich striks ou one of the company's claims, the Anaconda, au extsnsion on the Wild Flower lead. The first assessment work and the only work ever done ou this particular gronnd is uow being done, consisting of a crosscut on the lead. Already 30 feet ot work has been done, and no foot-wall yet. The ore is in layers or streaks, and very nearly the whole ledge is ore. As soon as the crosscut is finished, drifting will be commenced on the ore. There is every indication of immense quantities. as this is by all odds tbe largest lead in the Bradshaw mountains."

STEIKE AT BIO BUG.—Prescott *Courier*: A rich strike is reported in ths Poland mine, Big Bug district, the ore assaying $77 gold aud 48 ounces silver per tou; pay streak 12 feet wide. This property is dsveloped by a tnnnel 500 feet in length, the first 70 feet of which was run in non-paying formatiou, after which a strong ledge was struck, the ore rnuning from $10 to $15 per ton gold, 20 to 30 ounces silver and from 30 to 60 per ceut lead. The miue is owned by Messrs. Mnrphy & Dickey, but is being worked under lease by C. A. Raudal.

IDAHO.

MINEES TO RESUME OPERATIONE.—A epecial from Wallace, Idaho, Oct. 12tb, says: The Canyou Creek miues and the Gem aud Frisco mines uear here will start up Monday with a full force of men. The Miners' Union has practically won this fight, for $3.50 will be the nniform scale of wages, although the rate demanded a year ago was $4 for miuers aud $3.50 for carmeu and shovelers. With this settlement all tronble between the Miners' Union and Mine-Owners' Union is over unless there is trouble becanse the Wardner miners, who went to work several weeks ago and who made a contract with the ownere, are working for $3 a day, which is uot expected. With this settlement reached to-day, the leaders of both sides say that about 3000 meu will be working within a month, and the pay-roll will then reach nearly $500,000 a month. The ontpnt when tbe Cœur d'Alene mines are rnnning full blast, as thie uew agreement is snpposed to canse them to, will be about 400 tons of lead and 17,000 ounces of silver a day.

IN GOON CONDITION.—Idaho *Avalanche*, Oct. 14: Hon. W. S. Haskins, mine inspector for Idaho, visited onr camp the first of the week. He visited the DeLamar mines Mondav. On Tnesday he spent the day on Florida, and took his departure on Wednesday morning. From him our reporter learned that all mines visited were in excellent conditiou, as regards timbering and ventilation, and he speaks in tbe highest terms of the treatment he received at the hands of mine managers here. In a conversatiou bearing ou the geueral conditiou of the country, he said that we of Owyhee had uo concention of the distress and hardships which afflicted other portions of our State and conntry; that we had no kick coming, comparatively speaking.

MONTANA.

WORK RESUMED.—Butte *Inter-Mountain*: Tbe uews of the resumptiou of work at all of the Anacouda properties in this city after a shutdown of a few days, was received with delight by the large army of workingmen employed by the company. The force at the High Ore resnmed work yesterday morning.

The Butte & Boston, Boston & Montana and Heinze properties are being operated as uenal. At the Buffalo, whicb is under lease to Finlen & Hines, 225 tone of ore were shipped last montb, and 100 tons now await shipment ou the dnmp. The force of miners at thie property is distributed on the various levels, a few only being employed in extracting ore, the majority of them being eugaged in proepecting and development work. The ore is shipped to the Anaconda works for treatmeut.

Many of the prospectors who have been out all summer are retnrning to town. Some of them have beeu lucky aud located promising claims. Madison county is etill the favorite spot for the seekers of the yellow metal, and many valuable discoveries have beeu made tbere during the past season. With the completion of the Helena & Dillon railroad next year Madieon conuty will experience a gennine boom. There are a number of minee near Sberidan wbich would pay handsomely if the railroad facilities were ench that the ore could be shipped at a moderate cost. At present the transportatiou cbarges alone on ores shipped from there to Butte amount to $9 per ton, and, euch being the case, only the ricbest ores are worked. With cheaper rates, many of the mines containiug low-grade ore can he profitably worked.

THE ALPS.—Johu W. Opp retnrned from Bntte last Snnday, says tbe Phillipsburg *Mail*, where he spent several days attending to business connected with the Alps Miuing Company.

The boud of the Anaconda Company ou the Alps propsrty will expire this mouth, and if the company fails to raise the bond, then the ownere will at once proceed with operations. A full force of men will be put to work and the mill will be started up, giving employment to about 25 men.

The Alps is a first-class gold property, and when once in operation it will probably continue without interruption and prove a valnable enterprise to tbe owners.

THE BI-METALLIO.—The Bi-Metallic 100-stamp mill, near Phillipsbnrg, ceased operations entirely last week, says the *Silver State*. A few men, however, are still employed "cleaning up," and when that is completed the pay-roll will diminish from several hnndred men to abont a dozen watchmen. A crosscnt from one of the lower lsvels in the Bi-Metallic to the Butte tnnnel was recently completed, and as the Granite mine is connected with tbe Bi-Metallic by a crosscnt from the fourteenth level, both mines are drained into the Butte tnnnel, thus avoiding the expense of keeping tbe pumps in operatiou while the mines are shnt down.

OREGON.

RICH POCKET REPOETED.—Baker City *Democrat*, Oct. 9: It has leaked ont. bnt the accnracy of the report is uot corroborated at headqnarters, that the Virtne mine is richer than ever; that tbe great find of gold made several weeks ago, when it was estimated that $45,000 was taken out of a pocket, does uot compare with tbe find made a day or so ago. It is stated tbat the last "pocket" was so rich tbat tbe miners were bringing up the precions metal from tbe lower level to the surface in boxes. Whether the report is true or not we do uot know, bnt estimates made ou the find place it as high ae $75,000.

FINE OPALS.—Baker City *Democrat*, Oct. 9: The opal fields on Bnrnt river, near the farm of Mrs. Engene Smitb, are attracting cousiderable attention, and the precious stones found there carry the flue and variegated colors tbat make the Mexicau opal so valuable. Yesterday, Mr. J. W. Hall, a resident of the section where the opals exist, displayed a small vial containing many of these stones, eome of wbich were very handsome, one especially that Mr. Hall sent away aud had cut. Several persons are proepecting the fielde and with good success.

A VIEIT TO GRANITE.—Baker City *Democrat*, Oct. 9: F. T. Abbott, and W. F. Snodgrass of the *Gazette* of La Grande, retnrned Friday morning from a week's visit in the Granite Creek district. The Granite dietrict is alive with miners, moet of whom are eugaged in development work. The principal working mine is that of tbe Cable Bros., who are now ehipping a considerable amount of ore to the Tacoma rednction worke.

The district abounds in exteneive placer claims that have been worked during tbe entire snmmer, Granite creek having afforded snfficient for contiuuous operations. Tbe Monnmental employs a force of abont 20 men, and is once more rnnning on fnll time.

STRIKE ON MONOEE CEEEK.—Rogue River *Courier*, Oct. 12: Miune Caldwell and Sam Ryan have "etrnck it ricb" on Monger creek, a tributary of Williams creek, about 25 miles from Grant'e Pass. They are getting out good gold with pick and pan, and indications are tbat tbere is plenty of it abead of them. Tbis regiou lies along the bonndary of Josepbine and Jackson counties and was overlooked in the mad rnsh for rich placers 35 years ago. Tbe cauyons over there are full of hopeful prospectors, and old settlers predict flush times tbere this winter. Water is plenty and the bedrock ie found from four to ten feet.

J. C. Taylor, who has been bnsy at Galice creek all fall, reports things progressing in tbat part of Josephine aud predicte a bright future for the mines there. He has recently set up 1048 feet of giant pipe, which tapere from 23 inches in diameter down to tbe monitor with a splendid fall of 335 feet.

WASHINGTON.

OLD DOMINION RESUMES.—Colville *Republican*: Tbe Old Dominion Mining Company whicb bas been employing a emall force of men dnring tbe past two montbs, has made arrangements for more extensive operations, and accordingly has put on au additional force of 20 men. The force uow uumbers 40 miuers, and as soon as the concentrator etarts up, wbicb will be in abont two weeks, 20 more men will be added to tbe working force of the mine. Supt. Hanley has done much to improve and develop the property.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING OCT. 3, 1893.

506,055.—TRUNK AND DRESSING CASE—W. Burkman, Tacoma, Wash.

506,034.—INSULATING JOINT—S. W. Burtchaell, S. F.

506,037.—DEVICE FOR PASSING OBSTRUCTION — G. H. Forbes, S. F.

506,040.—BURGLAR ALARM—A. Hartman, Hawthorne, Nev.

506,115.—STOP VALVE—W. A. Johnston, S. F.

505,948.—THRASHER FEEDER—A. H. Lubking, Pomeroy, Wash.

506,079.—SLED PROPELLER—F. A. Schaefer, Truckee, Cal.

506,080.—SLEIGH—F. A. Schaefer, Truckee, Cal.

506,141.—ENGINE VALVE—H. H. Ward, S. F.

506,142.—HARNESS—L. J. Weatherway, Aberdeen, Wash.

22,825.—DESIGN—I. G. Hazzard, East Portland, Ogn.

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Market Reports.

The Markets.

SAN FRANCISCO, Oct. 19, 1893.

The feature of the week in the metal market has been the very decided weakening of lead. There seems to be no very good reason for it, as the reports to dicate no overplus of supplies. It is probable that the resumption of operations on the Cœur d'Alene had as much to do with it as anything else. Silver has weakened slightly during the week. There has been no essential chaoge in copper. Consumption abroad is very large, and the statistical situation is promising.

Circulation of Money.

The present circulation of money in the United States is the largest ever recorded, according to the statement issued by the Treasury Department on October 1st. The aggregate circulation is given at $1,701 939.918, which amounts to $25.29 per capita tor an estimated population of 67,306,000. This is an increase of $21,377.247 during the month of September, and of $105,889.935 since October 1, 1892. The chief items of increase are $14,829.741 gold, and $5,052,317 National Bank notes. The issue of standard silver dollars in actual circulation is $58,832,668, the silver certificates in circulation are $324.955.134, and the treasury notes $148,824 199, making the silver money of the country in actual circulation about $533.000,000, in addition to $64,102,205 in subsidary silver.

The circulation, by the Treasury figures, is now 85 cents more per capita than on July 1, 1892, about $2.50 more than on July 1, 1890, and nearly $6 more than on July 1, 1880. It is nearly 50 per cent in excess of the per capita circulation immediately after the resumption of specie payments on July 1, 1879, when the amoonnt was $16.75.

Coinage of the Mints.

During the month of September, the United States Mints coined 714,874 pieces of gold of the valne of $5.932,270, 2,382,400 pieces of silver of the value of $805.185, and 4.360,600 pieces of minor coinage of the value of $76,818.

San Francisco Metal and Coal Market.

ANTIMONY.		**QUICKSILVER.**	
Per lb	— @ 13	Home trade, pr. flask.....40 00 @41 00	
BORAX.		**STEEL.**	
Refined, in car lots	— @ 7¼	English, lb.....	— @ 18
Powdered, do....	— @ 7¾	Canton tool.....	— @ 8½
Concentrat'd, do	— @ 6¾	Sl'k Diam'd tool	8½@ 15
All grades jobbing at advance.		Pick & Hammer.	6½@ 10
COPPER.		Machinery.....	4 @ 6
Bolt.....	23 @ —	Toe Calk.....	— @ 4½
Sheathing.....	23 @ —	**PIG TIN.**	
Ingot, jobbing..	— @ 20	Spot ℔ lb.....	21½@ 22
Do, wholesale..	15 @ 16	**COAL.**	
IRON.		SPOT FROM YARD—PER TON.	
Bar, base.....	— @ 2½	Wellington.....	$8 00
Norway, base....	— @ 4½	Greta.....	7 50
PIG IRON.	Spot.	Nanaimo	6 50
Eglinton ℔ ton....	—@— —	Ollman.....	6 00
Glengarnock.....27	00@— —	Seattle.....	6 50
Am. Soft, No. 1..25	00@— —	Coos Bay.....	5 50
Shotts No 1.....27	00@— —	Cannel.....	9 00
Puget Sound.....	—@— —	Egg, bard.....	12 00
Clay Lane White..30	00@— —	Wallsend.....	7 25
Langloan.....27	00@— —	Scotch Splint.....	8 00
Gartsherrie.....27	00@— —	Brymbo.....	7 50
Barrow.....	—@— —	West Hartley.....	7 50
Cargofleet.....	—@— —	TO LOAD—PER TON.	
LEAD.		Australian.....	6 50@— —
Pig.....	— @ 4½	Liverpool Steam	6 87@— —
Bar.....	— @ 5	Scotch Splint...	7 00@— —
Sheet.....	— @ 8	Cardiff.....	7 00@— —
Pipe.....	— @ 5¼	Lehigh Lump....	10 00@— —
SHOT.		Cumberland.....	8 50@— —
Drop, sizes *smaller* than B, ℔ bag of 25 lbs.....$1 75		Egg, hard.....	9 00@— —
Do do, B and *larger* sizes ℔ bag of 25 lbs.....	2 00	West Hartley.....	7 50@— —
Buck, Balls and Chilled do, ℔ bag of 25 lbs.....	2 00	**COKE.**	
		English, to load..$9 50@10	00
		Do, spot, in bulk.—	—@12 00
		Oo, in sacks.....	— @14 00
		Oumberland.....	9 50@— —

Silver and the Metals.

NEW YORK, Oct. 19.—Following are the closing prices for the week:

	Silver in London.	N. Y.	Copper.	Lead.	Tin.
Thursday	33¼	73¼	9 65	3 50	20 70
Friday	....	....	....	....	.....
Saturday	33⅜	....	....	....	.....
Monday	33¼	73	9 50	3 30	20 80
Tuesday	33¼	73	9 50	3 30	20 90
Wednesday	33¼	73	9 50	3 30	20 80

Mining Share Market.

SAN FRANCISCO, Oct, 19, 1893.

The Comstock market is experiencing a revival, caused largely by the ratification of the deal between James H. Rule and the Con. Cal. and Va., whereby he agrees to uncover a rich body of ore above the 1100-foot level. Tuesday Con. Cal. and Va. advanced to $2.50, while Ophir and most of the other stocks had a proportionate advance, with large transactions. The feeling on the street is now more hopeful.

Wednesday, however, some weakness developed, and Con. Cal. and Va. dropped back to $2.

This activity in the market has taken place despite the action of the miners' union in refusing to concede a reduction of wages.

It is said that other expenses have been materially reduced, and the mines will continue to operate as long as they can secure funds. On and after Monday, Oct. 16th, the price of lumber delivered at the Comstock mines was to be reduced from $22 to $19 per 1000 feet, and wood will be reduced from $9 to $7.50 per cord. A material reduction, in some cases amounting to 50 per cent, has been and is being made in the cost of water furnished to the mines. Transportation of ores will be scaled down. Salaries have for the past two months been 25 to 50 per cent below what they previously were. With such reductions as have been made, some of the mines will go on, and it may be that new bodies of ore will be uncovered in them. Other mines may have to close down.

Charles T. Harper, foreman of the Consolidated California & Virginia mine, who was sent for by James G. Rule a short time ago, has been in the city closeted with Mr. Rule, and together they discussed a plan of operations for the futnre campaign in the upper levels of the mine. Mr. Harper will return to Virginia City and get everything in readiness for the proposed work at the old Con. Virginia shaft, so that there will be no delay. By the time Mr. Rule is able to go out they will be ready to start this work. Mr. Harper says that no work has been done in the section above the 1100 level, where ore is expected to be found, since Mr. Rule left the mine in 1886, so that no chances for finding ore have been exhausted.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, October 19, 1893.

9:30 A. M. SESSION.

250 B & B	70c	300 Mexican	70c
150	65c	500 Ophir	1.15
100 Bullion	30c	20	1.20
100 Caledonia	10c	100 Overman	15c
500 Con. Cal. & Va	2.40	100 Potosi	65c
770	2.35	450 Sierra Nevada	60c
500 Crown Point	25c	100 Union	35c
200 Chollar	30c	50 Utah	10c
400 Hale & Norcross	35c	300 Yellow Jacket	60c

2:30 P. M. SESSION.

100 Andes	25c	400 G & C	35c
553 Bodie	22c	100 H & N	50c
200 Best & Belcher	70c	50	75c
400	75c	100 Mexican	70c
300 Belcher	40c	300 Ophir	1.15
50 Conference	60c	100 Sierra Nevada	65c
600 Crown Point	25c	100 Savage	40c
650 Con. Cal. & Va	2.35	200 Yellow Jacket	60c

Pacific Stock Exchange.

9 AND 10:15 A. M. SESSIONS.

350 Belcher	37c	100	68c
200	38c	200	69c
300	40c	250	70c
950 B & B	70c	700 Ophir	1.15
300	69c	200	1.10
200	68c	200	1.10
400	67c	300	1.20
500	67½c	300 Kentuck	5c
650 C. C. & Va	2½	400 Overman	15c
2600	2 3c	200 Potosi	63c
300	2.32½	200	67c
2500	2.30	250 Savage	40c
50	2½	150	37½c
500 Chollar	28c	200 S Nev	6.0
400 Crown Point	25c	200 Union	33c
250 Gould & Curry	31c	300	35c
700 Justice	12c	850 Y Jacket	60c
400 Mexican	65c	150	65c
150	67c	250	58c

2 P. M. SESSION.

300 Belcher	41c	150 Mexican	70c
100 O O & V	2 30	150	69c
250	2.32½	300 Ophir	1.17½
150 G & C	35c	200 Potosi	64c

Cal. Debris Commission Notices.

NOTICE.—The California Debris Commission, duly appointed under the Act of Congress of March 1, 1893, having received a petition from H. Buckley and Louis L. Hillman for permission to mine by the hydraulic process in the Illinois Gold Gravel Mine, at Secret Diggings, near La Porte, Plumas county, California, and to deposit tailings in an old hydraulic pit, hereby gives notice to all concerned that a hearing will be held at the office of the Commission, Room 92, Flood Building, San Francisco, on October 24, 1893, at 1:30 o'clock P. M. On and before this hour and date all parties interested may file affidavits, plans and maps in support of their respective claims. By order of the Commission: W. H. Heuer, Major, Corps of Engineers, U. S. A, Secretary of the Commission.

NOTICE.—The California Debris Commission, having received petitions to mine by the hydraulic process from Westall and Hughes, in the New York mine in Sierra county, to deposit tailings behind a dam in Howard creek; from Corbiere and Bean, near Clipper Mills, Yuba county, to deposit tailings behind a dam in Hampshire creek; from W. A. and M. E. Schofield, in the Phœnix mine, near Hepsidam, Sierra county, to deposit tailings behind dams in Whisky creek and the North Fork of Slate creek; from the Craycroft Mining Company, in the Craycroft Hill mine, near Downieville, Sierra county, to deposit tailings behind dams in Davidson ravine; from the Excelsior Mining Company, in the Excelsior hydraulic mine, near Downieville, Sierra county, to deposit tailings in and near Eagle ravine; from the Eureka Mining Company, in the Eureka mining claim, near Downieville, Sierra county, to deposit tailings behind dams in Kanaka and Sawmill ravines, and from the Quincy Mining and Water Company, in the Bean Hill, Jack's Hill, Mountain House, Gopher Hill and Shore's Hill claims, near Spanish Ranch, Plumas county, to deposit tailings in old hydraulic pits and behind dams in Maurer ravine, Spanish creek and Green flat, gives notice to all concerned that a hearing will be held at the office of the Commission, Room 92, Flood Building, San Francisco, on November 7, 1893, at 1:30 o'clock P. M. On and before this hour and date all parties interested may file affidavits, plans and maps in support of their respective claims. By order of the Commission: W. H. Heuer, Major, Corps of Engineers, U. S. A., Secretary of the Commission.

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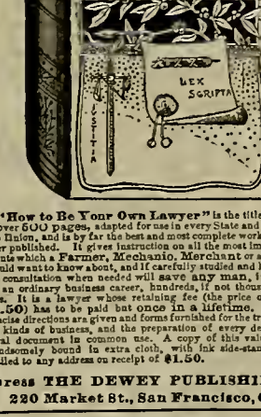

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ASSESSMENTS.

COMPANY AND LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T AND SALE.	SECRETARY.
Amador G Mine, Cal	1	5c	Sept 7, Oct 12, Nov 7		F E Luty, 330 Pine
Arnold G and S M Co, Ariz	5	50c	Sept 13, Oct 23, Nov 9		A Judson, 320 Sansome
Bay State M & Dev Co, California	16	2c	Aug 26, Sept 23, Oct 25		W Coster, Plymouth, Cal
Belle Isle M Co, Nev	19	10c	Sept 23, Nov 2, 24		J W Pew, 310 Pine
Bodie Cons M Co, Cal	16	15c	July 24, Sept 25, Oct 24		M E Willis, 309 Montgomery
Bodie Tunnel & M Co, Cal	17	10c	Sept 5, Oct 7, Oct 24		Chas C Harvey, 309 Montgomery
Brunswick Cons G M Co, California	6	2c	Sept 4, Oct 6, Oct 24		J Stadtfeld, 56 Nevada Block
Caledonia G M Co, South Dakota	17	50c	Sept 13, Oct 16, Nov 15		F G Drum, Mills Building
Challenge Cons M Co, Nevada	15	5c	Oct 10, Nov 14, Dec 5		C L McCoy, Mills Building
Chollar M Co, Nevada	36	10c	Oct 9, Nov 14, Dec 7		Chas E El lot, 309 Montgomery
Cons New York M Co, Nevada	11	5c	Sept 27, Nov 1, Nov 22		Chas E Elliott, Nevada Block
Con Wyoming G M Co, Nev	3	5c	Oct 3, Nov 13, Dec 2		W J Gurnett, 308 Pine
Crown Point G & S M Co, Nevada	62	10c	Sept 25, Oct 31, Nov 21		James Newland, Mills Building
Do a Gold Mining Co, Cal	1	5c	Aug 25, Sept 25, Oct 25		Chas J Blumenthal, 415 Montgom'y
Granite Hill M & D Co	1	1½c	Oct 10, Nov 11, Nov 27		J M Wil y, Grass Valley
Gray Eagle M Co, Cal	34	5c	Oct 11, Nov 15, Dec 6		Chas C Harvey, 309 Montgomery
Kentuck Cons M Co, Nevada	7	10c	Oct 5, Nov 9, Nov 30		Aug Waterman, 309 Montgomery
Martin White M Co, Nevada	29	25c	Aug 31, Oct 26, Dec 14		K L Ross, 120 Sutter
Mt George M Co, Cal	3	1c	Sept 26, Oct 31, Nov 18		J M Thomas, Grass Valley
Occidental Cons M Co, Nevada	14	10c	Oct 9, Nov 13, Dec 4		Alfred K Durbrow, Nevada Block
Orleans M C'o, Cal	13	$2	Aug 29, Oct 9, Oct 31		Geo P Thurston, 575 Mission
Overman S M Co, Nevada	68	5c	Sept 1, Oct 5, Oct 26		Geo D Edwards, 414 California
Potosi M Co, Nev	39	25c	Sept 11, Oct 16, Nov 7		Chas E Elliott, 309 Montgomery
Siskiyou Cons Quicksilver M Co, Cal	7	1c	Aug 29, Oct 3, Oct 27		Edw F Stone, 306 Pine
St John Quartz M Co	8	5c	Oct 14, Nov 14, Dec 2		J M Wiley, Grass Valley
Tetrakoff S M & M Co, California	10	1c	Aug 18, Sept 23, Oct 19		W J Gurnett, 308 Pine
Union Con S M Co, Nev	43	20c	Oct 3, Nov 8, Nov 29		Chas E Harvey, 309 Montgomery
Utah Cons M Co, Nevada	19	5c	Sept 1, Oct 4, Oct 25		A W Havens, 309 Montgomery
Valenzuela Cons M & L Co	2	1o	Sept 20, Oct 23, Nov 10		A Everett Ball, 431 California

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE
Altoona Quicksilver M Co, Cal	Adjourned	Chas Allenberg, 630 Brannan	Nov 2
Brophy M Co	Regular	337 Pine	Oct 31
Bulwer Con M Co	Special	L Osborn, 309 Montgomery	Nov 8
Evening Star M Co	Special	J J Scoville, 320 Sansome	Oct 23

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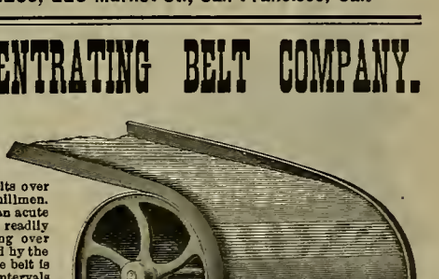

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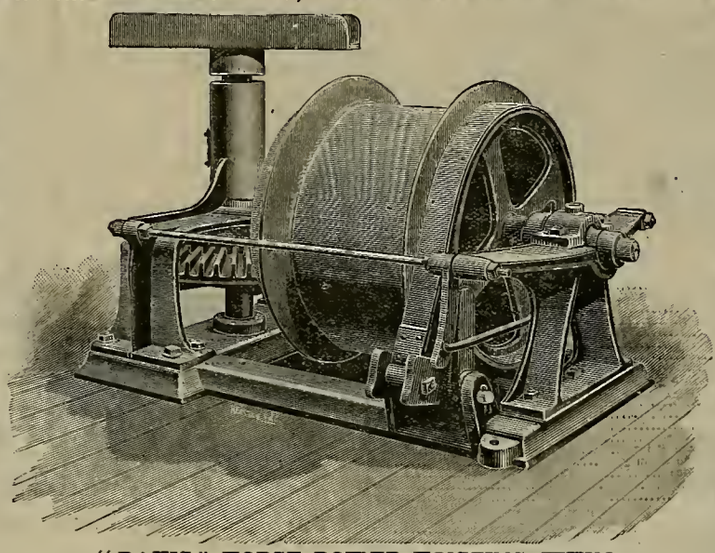

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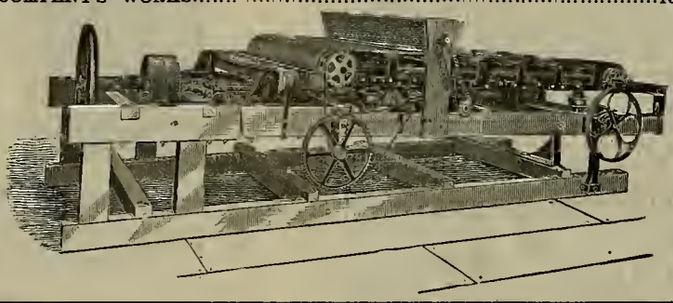

FALLS MINE, IOO, SHASTA CO., CAL., May 25th, 1893.

MR. THOS. MCGLEW, President McGlew Ore Concentrator Company—Dear Sir: I take much pleasure in endorsing your very superior Ore Concentrator. When I was requested to examine your concentrator, I did so under protest, declaring that I would have none other than a True as after many years experience with different concentrators, I believed them to be the best.

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Samples of pulp and tailings, taken every hour, dried, mixed and assayed, show * * * from West ledge, a saving by your concentrator of 94½ per cent; from East ledge, * * * a saving of 92 per cent.

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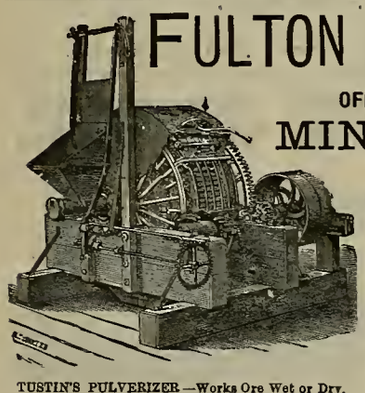

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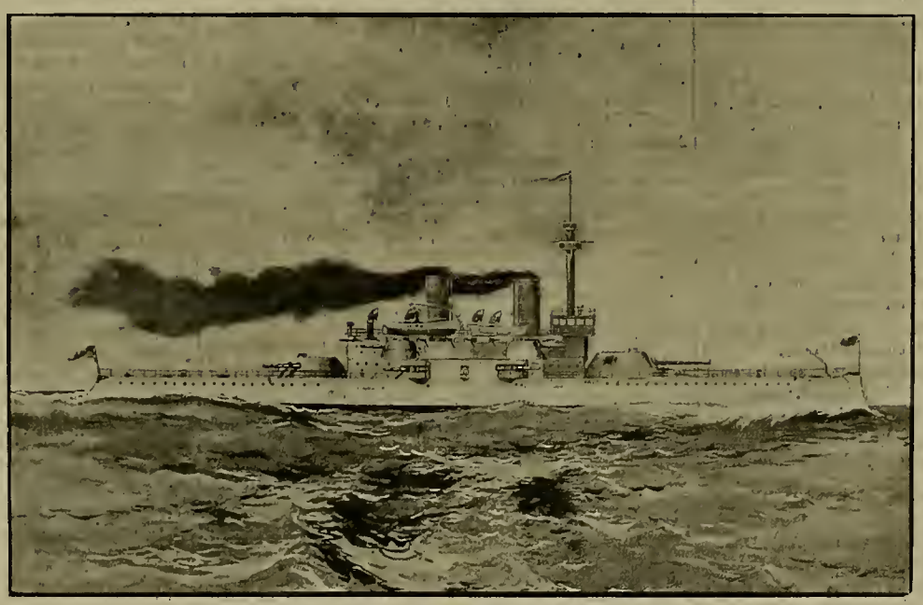
An Illustrated Journal of Mining, Mechanics and Popular Science.

VOLUME LXVII. Number 18. SAN FRANCISCO, SATURDAY, OCTOBER 28, 1893. Three Dollars per Annum. Single Copies, 10 Cents.

Launching of the Oregon.

The battleship Oregon, the most formidable of the new American navy, was launched from the Union Iron Works at the Potrero, San Francisco, Thursday, Oct. 26th, at 11:46 A. M. (high tide). The Oregon is not only the largest vessel in the navy, but has the largest displacement of any vessel ever launched in American waters. The event was celebrated with great splendor and enthusiasm, in the presence of a tremendous crowd on shore and in a fleet of vessels on Mission bay. Miss Daisy Ainsworth, representing the State of Oregon, performed the christening, while Miss Eugenia Shelby, representing the city of Portland, pressed the button that started the great vessel down the ways. No accident occurred.

The Oregon has been frequently described, but it is appropriate again to give a few of the leading facts and figures relative to her construction: The vessel, when complete, is to have a displacement of 10,298 tons, and her principal dimensions are: Length, 350 feet 9 inches; breadth, 69 feet 3 inches, and depth, from keel-plate to superstructure, 42 feet. She was contracted for under the Naval Construction Act, passed by Congress June 30, 1890, and is to cost, exclusive of armament, nearly four million dollars. The minimum speed to be maintained for four consecutive hours is to be not less than 15 knots. The hull is of steel, not sheatbed. Her framing is on the bracket system, and she has a double bottom extending from armor-shelf to armor-shelf, and forward and aft. The armor on her sides, for protecting the water line, will have a maximum thickness of not less than 18 inches, with a mean depth of seven feet, and the transverse armor at the ends of the belt line will not be less than 17 inches thick. The sides from armor belt to main deck, will be protected by not less than five inches of steel armor.



THE U. S. BATTLESHIP OREGON.

Coal is to be carried back of this casemate. An armored deck, not less than three inches in thickness, will extend forward and aft from the ends of the armor belt, being curved down on each side to meet the side of the ship below the water line. Over the side armor belt this steel deck will be not less than 2¾ inches in thickness. The Oregon will have an approved water-excluding material equal to woodite or cellulose, fitted along the sides, forward and aft, on the slopes of the three-inch protective deck.

She will be supplied with powerful guns, aggregating in all 631 tons. They will include four 13-inch breech-loading rifles, weighing 60 tons each, with their mounts, shields and equipments; four eight-inch breech-loading rifles; four 6-inch breech-loading rifles; sixteen 6-pounder rapid-firing guns; six 1-pounder rapid-firing guns, and two Gatlings, with all necessary mounts and shields therefor. It will require 306 tons of ammunition to complete the vessel's fighting outfit.

Her 13-inch guns will be protected by 17 inches of armor. The axes of these guns are to be not less than six feet above the deck, and due regard must be paid to interference of fire and the effects of the blasts of the various guns. The six and eight-inch guns will be protected by shields, and, in addition, by barbettes or otherwise, carrying four-inch armor for the six-inch guns, and six-inch armor for the eight-inch guns. The ammunition for the eight-inch guns will be supplied through armored tubes.

The Oregon will carry 12 torpedoes. There will be seven above-water torpedo tubes—two forward, one aft, and two on each side. She will also carry a distilling apparatus, which will supply fresh water; the allowance of water to be carried is to be enough to last 15 days, besides water for sanitary purposes. The vessel will have a complete electric-light plant.

The special duty of the Oregon will be to engage in conflict with any vessel of any hostile fleet; to protect our ports from invasion and bombardment from sea; to act as convoy to merchant fleets in time of war; and to perform any large sea service that may arise in the emergency of war. Her equipment is powerful enough to insure that the dignity and honor of the nation will be preserved on the seas against all comers, if she is intelligently manned.

The Union Iron Works have contributed to the navy a number of its fleetest and most serviceable cruisers, besides the Oregon. The extent of its work in this branch of naval construction is indicated by the following:

CRUISERS BUILT BY THE UNION IRON WORKS.

	U. S. S. Charleston.	U. S. S. San Franc'o	U. S. S. Monterey.	U. S. S. Olympia	Battle Ship Oregon.
Displacement in tons	4,040	4,083	4,000	6,870	10,200
Indicated horse-power	6,660	10,400	5,400	13,600	9,000
Speed in knots	18.206	20.17	16	20	16
Main battery (B. L. R.)	2 8-in.		2 12-in.	4 8-in	4 13-in.
	6 6-in.	12 6-in.	2 10-in.	10 6-in.	8 8-in.
					4 6-in.

THE *Mountain Messenger* at Downieville, Sierra county, appreciatively declares that the MINING AND SCIENTIFIC PRESS is the only paper except the daily *Report* which has stood up for the miners' cause. Says the *Messenger*: "The *Chronicle*, *Examiner* and *Post* have all declared for the miner, but in a half-hearted way, as if in fear of insulting the valley people, and dare not call their souls their own."

To Mine the Sacramento's Bed.

A river mining enterprise of large proportions has been organized at Redding, Shasta county, having for its object the working of gravel in the bed of the Sacramento river from Turtle bay to the free bridge. The promoters of the scheme are the local electric light and water companies and the Deakin Brothers. The Shasta County *Democrat* says the company intends to make use of and complete the shear-dam the Electric Light Company has been putting in, and turn a great volume of the water into the Electric Light Company's ditch, which is large enough to carry nearly all the water in the river at this season of the year. By accomplishing this—and competent engineers say it can be done at a reasonable cost—they will be able to work the rich gravel below the dam. There is no question about the gravel being rich in gold, for that has been proven without any guesswork. Miners who have worked in the gravel for several seasons past in water up to their waists have been and are now making big wages. Aside from this the company contemplates continuing the ditch down to Cottonwood for irrigation purposes, and will endeavor to interest foreign capital in this irrigation scheme.

As soon as spring opens a large force of men will be put to work and operations begun on a big scale. The company will work day and night. Electric wires will be run from the Electric Light Company's power house, and the work by night will be accomplished with the aid of arc electric lights strung along the river. This enterprise will give employment to several hundred men.

THE bill changing the end of the assessment-work year from December 31st to September 30th, which recently passed the lower house of Congress, has likewise passed the Senate with an amendment excluding corporations from its benefits. The concurrence of the House is now needed to make the measure a law. The Senate amendment is inexplicable. It is not based on justice or a proper view of the needs and wishes of the miners. It will serve simply to muddle the whole matter, and provide one law for corporations, another for private owners of mining claims. The bill does too much, anyway. In view of the hard times, no one will seriously object to suspension of the present law for nine months or for a year. Miners, particularly in Colorado and Montana, need encouragement and relief. But the change in the law should be temporary, not permanent. The assessment year is satisfactory as it is.

CONGRESSMAN CAMINETTI is still after reservoir sites and proposes to store them up in time. It is a wise provision. A bill he has just introduced provides for conditional grants of lands and lakes to the State of California and the counties and irrigation districts therein for storage reservoirs, for irrigating, mining, manufacturing, or any industrial or other useful purpose. The Secretary of the Interior is intrusted with the execution of the law if it should become such.

MINING AND SCIENTIFIC PRESS.

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Our latest forms go to press on Thursday evening.

Entered at the S. F. Postoffice as Second-Class Mail Matter.

San Francisco, October 28, 1893.

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EX-CONGRESSMAN JOHN K. LUTTRELL, well known to miners of this State, died at Sitka, Alaska, Oct. 4th, of Bright's disease. He was at the time of his demise United States Commissioner of Fisheries for Alaska. Mr. Luttrell was a pioneer, and was at an early date county judge of Alameda county. He was at various times engaged in mining. Some years ago he purchased a large tract of land in Sonoma county, and there settled down to a quiet agricultural life. Twelve years ago he was elected to Congress from that northern district. He served three successive terms and made an honorable record for himself. Subsequently he was appointed Prison Director by Governor Stoneman. During all this time he continued his agricultural pursuits. Mr. Luttrell took a very prominent part in the first State Miners' Convention, in January, 1892, and afterward rendered notable service to the miners as delegate of the convention at Washington. His death will be mourned by all miners.

AN incorrect report of Judge Searls' speech at the late miners' convention, appearing in one of the daily papers, has caused another teapot tempest in the Anti-Debris Association. Judge Searls, after declaring that George Ohleyer had said publicly he would "not approve a hydraulic-mining bill if God Almighty were to present it to him," appealed to Robert T. Devlin to corroborate his statement. There was no response; but an imaginative reporter thought he saw a chance for a fine climax, and he represented Mr. Devlin as calling out: "You are entirely right." Mr. Devlin, as a matter of fact, was not in the hall, and so no one heard him make any such response, and no one declared he made it except this one reporter through his newspaper. Judge Searls was fully and correctly reported in the MINING AND SCIENTIFIC PRESS, which contained the best report of proceedings published.

THE Comstock lode is by no means suffering from its first crisis. It has "been there before." Theodore Sutro, president of the Comstock Tunnel Company, tells when and how in his annual report: "In 1870 the market value of the entire lode, as represented in shares, was about $4,000,000, while in 1875, after the discovery of the bonanzas in the California and Virginia mines, it appreciated to about $275,000,000. In 1882 it had again declined to about $3,000,000, but on the discovery of the new ore body in the mine of the Consolidated California & Virginia Company in 1886, the market value again rose to about $36,000,000." This would seem to indicate that periods of depression may be expected about every twelve or fourteen years.

The letter of the Midwinter Fair committee of the State Miners' Association to the miners of the State will be found on page 285 of this issue.

Anti-Debris Advocates Then and Now.

The anti-debris papers have recently devoted an amount of their more or less valuable space to a rehearsal of the history of the anti-debris share in recent congressional legislation; and some way they seem to find it necessary to do a deal of explaining. The delegates who were sent on to Washington from the River Improvement Convention in 1892 were expressly instructed to work in conjunction with the delegates from the Miners' Convention.

It is well known that they totally failed to carry out their instructions, and that, on the contrary, they bitterly antagonized the Miners' Committee at every turn. Their course was as unexpected as it was unjustified. The Miners' Convention in this city, comprising delegates from all the mining and anti-debris counties, had clearly and unitedly laid down the lines of legislation, and there was no suspicion that the anti-debris people would not keep the faith. It is worth while at this time to recall some of the utterances of the foremost anti-debris delegates to the convention, as they were chiefly instrumental in bringing about the general conviction that entire harmony between the conflicting interests had been restored. They read very strangely in view of the subsequent utterances and actions of the present anti-debris representatives.

It is proper to say that the Sacramento and other anti-debris county delegations took a very prominent part in the discussion and made more and longer addresses, perhaps, than the miners. They had quite as much to do with shaping the policy of the convention as the miners, and from first to last there was no expression that was not friendly, considerate and, apparently, genuine. Following are extracts from the addresses of several gentlemen, all representing the anti-debris interest:

V. S. McClatchy of Sacramento:

We believe you will not do anything to injure us. We say that we extend to you the right hand of fellowship.

The Sacramento delegation came down to assist in any way it can in solving this great problem of finding some means for allowing the prosecution of hydraulic mining which will not injure the rivers or our homes, and in any means that will accomplish that object we are with you.

We will work with you, doing what we can to accomplish it. We want to stand together and foster every industry that will tend to develop its (California's) great resources.

R. T. Devlin of Sacramento, attorney of the Anti-Debris Association:

There is no people who would more gladly see the hamlets and the villages of the mining regions of California filled with a happy and prosperous population than the people of Sacramento. If it is meant to pass laws by which engineering skill may aid in determining the work, we will stand with you hand in hand.

Grove L. Johnson of Sacramento:

I desire to say that no body of men ever yet exceeded this convention of miners in their desire to make peace with their enemies and to cement friendship with them.

I find every man in this convention animated by the same purpose that, under God, I believe and feel, namely, to do all in our power to aid the miners of this State, and to once more pour forth from the mountains of the Golden State, that we all love, the millions of dollars that shall aid the commerce, aid the people and aid, if need be, in the throes of battle, the Government of the United States.

I believe to-day that there are engineers able, competent and willing to solve this question and to properly construct these dams in such a manner as, in the language of the resolutions, to impound the mining debris and prevent injury to the navigable waters of the State. That is all we ask; that is all any man ought to ask.

I believe if a united delegation goes to the national representative hall in Washington, and the farmer hand in hand with the miner of California knocks upon the door of the treasury of the nation, it will be open to us to carry out these works that we have projected and that we have endorsed.

Let the dead past bury the dead. Let all animosities be drawn and buried in the slickens you have deposited in the bed of the rivers.

Thomas J. Clunie of Sacramento:

If there ever was an industry that ought to be fostered and encouraged, it is the great industry of mining.

We have all joined hands together.

I say in the name of justice we are not asking too much of the Congress of the United States when we say to them: "You sold the mine to the miner; you sold the land to the farmer; and these great industries, in order to have our State flourish, must go hand in hand, and it is your duty to take such steps as are necessary to point out the way."

With the Government at our back, any plan suggested by them (the miners) will meet my approval, and you will find me walking hand in hand with all the miners of the State to bring about legislation that will foster both of these interests (farmers' and miners'.)

I know and feel in my heart that you will be successful. With equities on our side, they (the General Government) cannot refuse the requests of this convention.

C. P. Berry of Sutter:

I wish to disabuse the miners here present of a feeling that perhaps prevails among them, and that is that we are antagonistic to the mining interests. Such is not the case. We in the valley recognize the great importance of the output of gold. We are as anxious for gold as you yourselves dare be, and we are willing to shovel mud and build levees and drink muddy water, to the extent we can, and yet exist, in order to get your gold.

We don't wish to suppress any industry that tends to build up this great State.

Miners, we have accepted the pledge you have given—that is, that you will obey the laws, and that we will not be compelled hereafter to send spies into the mountains to see whether you are invading the law; and, therefore, accepting the pledge that you have given to us, now we are willing to second any effort that you will make so that the mining industry will be rehabilitated.

The miners have in no instance violated the spirit or letter of the resolutions of this convention. They accepted the statements of these gentlemen as pledges of like good faith on their part; and they are forced to the conclusion that they have either broken faith or they did not represent the sentiment of the people they pretended to represent.

Mr. Caminetti a Trifle Hasty.

Congressman Caminetti is reported by telegraph advices to have introduced in Congress "pursuant to a resolution adopted by the State Miners' Convention, Stewart's mining bill with the following change in section 2335 of the Revised Statutes, as contained in the Stewart amendments:" The provision recommended by the convention declaring that the "presence of rock in a place bearing gold, silver, cinnabar, petroleum or other valuable mineral shall be regarded as presumptive evidence that the land containing the same is and always has been mineral in character," etc., etc., follows; and also the declaration that the officers of the land department shall construe the provisions of law relative to the acquirement of title with great liberality.

Congressman Caminetti is precipitate, to state it mildly. He was not authorized by the California Miners' Convention, or any other organization, to present the result of their deliberations to Congress. The duty of embodying the views of the convention in the form of a bill was expressly vested in the hands of a committee which was to seek its own method of bringing the matter to the attention of Congress. The committee has not acted and has not communicated with Congressman Caminetti, or any other Congressman, and doubtless will not until it is ready. If Mr. Caminetti has been correctly reported, he has placed himself in the position of giving life to an all but moribund bill (the Stewart bill had not been presented at this session), very objectionable to the miners of California, after making only two of the several important changes strongly desired and urged by the convention.

California miners know that Mr. Caminetti has in the past rendered them important services; but hardly more valuable and not more deserving of appreciation than the services of other California members of Congress. His friendship, his influence, and his interest and energies are desired in the future. They will be sought with those of other Congressmen. But he has not yet been chosen by the miners to press their claims or represent their interests; and he should, in common courtesy, wait until they have expressed their desires to the delegation. The committee will in due time frame the bill outlined by the convention, and it will be presented with the endorsement of the miners of California. The criticism may then justly be made that Mr. Caminetti's bill is not what it has been said to be—the convention bill—and, it seems to us, his position will be somewhat awkward, both before Congress and before the California miners.

Mr. Caminetti would better withdraw his bill and wait till he hears from home.

IN an interview with a *Bulletin* reporter, Major Jones, of Oroville, says there is much activity in the mines of Butte county; but there is "no movement to reopen any of the old gravel claims under the Caminetti Act." Major Jones' statement is incorrect. Of 13 formal applications already made to the Debris Commission two are from Butte county. One, however is a new claim. But there are some 20 other mines which are or have been in correspondence with the Debris Commission relative to operation under the Act; and some of these are no doubt from Butte county. The resumption of operations in hydraulic mining is a large proposition and it takes time. But it is bound to come in one shape or another.

THE administration appears to have won its fight for the repeal of the Sherman Silver-Purchase Act. The silver Democrats have announced that they will no longer be parties to obstructive tactics, and it seems probable that an early vote will be reached. The silver men have made a strong fight in face of heavy odds. Desertion from their own camp was, apparently, the last thing they had to fear. Their success otherwise was probable. Now defeat seems inevitable. But they go down with colors flying, and are entitled to all the honors of war.

THE MINING AND SCIENTIFIC PRESS has been asked to state if the bill in Congress changing the assessment year relates to silver mines, or all mineral claims. The text of the bill has not been received here, but it may safely be assumed that it affects all quartz claims upon which annual assessment work must be done.

Proposed Change of Assessment Year.

By Hon. Edward A. Belcher, San Francisco, Member Executive Committee, Legislative Committee and Committee on Revision of Law, California Miners' Association.

My attention bas been called to a bill in the Congress changing the commencement of the "mining year" from January 1st to October 1st. The hill seems to have passed the House of Representatives and to have passed the Senate with the modification that it shall not affect corporations, and to have gone to a conference committee. The so-called "Stewart bill" contained a similar provision, and the legislative committee of the late California Miners' Convention, to whom the bill was referred for criticism, were unanimously of the opinion that a change of the law in that respect was inexpedient and ill-advised. They reported adversely upon tbat proposed change of the law, and tbeir report was adopted without dissent. I have not the bill before me and therefore can make only a general criticism.

As I nnderstand it, bowever, the bill is objectionable upon many grounds. At the outset it may be said that a law affecting mining interests ought to he general in its operation. As amended hy the Senate tbe proposed act does not affect corporations. It is not perceived why an exception should be made. It would be anomalous that the year within which Jones shonld perform his annual labor and make his expenditure should commence on January 1st and the year of the Jones Company, a corporation, should, for the same purpose, commence on the first day of October.

The law, as it now stands, is well understood and well settled. Mere novelty in legislation ongbt to be avoided at all times, particnlarly where valuable property rights may be disturbed.

Among other tbings the change, if made, would be almost sure to invoke that *bete noir* of the honest miner—the "jumper." Any legislative distnrbance of the *status quo* is always had for the miner; and the "jumper" wonld almost inevitably result from such a cbange as that proposed, for miners in distant inter-mountain regions would hear of the change in the law either too late or not at all.

The proposed change wonld make a bad rule in this, also: In several of the States there are statutes similar in effect to tbe Federal statute, and if the State statutes were not changed so as to become operative *pari passu* with the Federal statute, the situation would invite contention, litigious and otherwise, not that the Federal statute would not prevail—it would, of course,—but the very fact that the Federal statute furnisbed one rule and the State satute another would, of itself, tend to disturb settled conditions.

It is not perceived, either, how the change can be advantageous even in the inter-mountain States. California, Arizona and New Mexico are practically winterless, so far as concerns mining operations, and of course the change of the commencement of the mining year from January 1st to October 1st works no advantage whatever; but in the inter-mountain States, as I view the question, the proposed change is really detrimental to the miner, as it gives him a less available period to do annnal work than he now has, and makes the possibility of "jumping" much greater, because the time of the year would be more available for the stealing of a mine than the bleak and inhospitable weatber that obtains in the inter-mountain mining regions about the first of January.

The excuse that certain of the miners in the silver-producing regions will find the performance of the one hundred dollars' worth of annual labor, etc., a burden this year, on account of the low price of silver, is inadequate. At most, it furnishes occasion for no more than a relief bill, such as has many times been passed for the benefit of pre-emption and homestead settlers whose crops have been destroyed by grasshoppers or by drought. Certainly it is not a good reason for changing the entire law.

EDWARD A BELCHER.

HON. EDWARD A. BELCHER, a lawyer particularly well known in mining circles of the State, has jnst been appointed by Governor Markham to the judgeship of the Superior Court of San Francisco made vacant by the recent resignation of Judge Garber. Judge Belcher's character, abilities and experience eminently qualify him to fill the honorable position for which he has been selected. The appointment is indorsed by the entire public. It is perhaps proper to mention that an article in this issne by Judge Belcher was written before his elevation to the bench.

IN excavating for the sewer in Ohio street, which extends from Park to Porphyry, just east of the Clarence hotel, says the Butte *Miner*, three or four large veins of gold-silver ore, which are rich in both metals, have been cnt through by the workmen. One vein is 15 feet in width, and is so rich in the precious metals that the drillers find it difficult to sink holes. Rnmor has it that the workmen take home large chnnks of the metal every evening and nse them for door weights. If this allegation is true, the ore is just a little richer than any heretofore found in the Silver Bow county.

The Mineral Exhibit at the Fair.

If plans now being formulated are carried out, the display of California minerals at the coming Midwinter Fair will be the most elaborate and pretentious ever attempted; and there is excellent reason to believe that a most complete, instructive and attractive exhibit of mining macbinery and appliances will likewise be made. Mining is a leading industry of California. The pursuit of gold has been identified with the history and progress of the State in sucb a manner as affords no parallel in any other State or country. There are associations and traditions connected with gold hunting in this State that give it an air of romance as thrilling and appealing as the fabled hunt of Jason and the argonauts for the Golden Fleece. The opportunities for a great display, both material and sentimental, have never been exceeded and not, indeed, eqnalled. Many things that are useful and novel can be shown; and it is with much satisfaction that we announce that they will be. Secretsry Ralston, of the State Miners' Association, says in an interview:

"We have had every enconragement, and believe that tbere will be no trouble abont raising $25,000 and in filling the 10,000 feet of space we have engaged. Our idea is to make the exhibit of practical benefit to the public. Among other things showu will be a five-stamp quartz mill with a conceutrating plant attached. Quartz in bulk will be snpplied to illnstrate the workings of the mill. If the ground in the Park should be firm enough we may show the nndergronnd workings of a mine, with a circnlar drift, and take the ore for the mill right out of the ground. This would give people an opportunity of riding dowu a shaft on a cage and of going through a mine without inconvenience. It would be a novel experience, not only to visitors, bnt to a majority of Californians. Another idea is to show the evolntion of quartz-crushing methods, from the arrastra to the stamp mill with concentrator, and in hydranlic mining to show the stages of progress from the rocker and long-tom to the hydranlic mine. There will be an exhibit of monitors and of hydranlic machinery of all kinds. We will show what is being done and how. Suggestions have been made to have a '49 scene, with log cabins, tents, etc. In fact, forty featnres have been proposed, and if our calculations do not miscarry, the mining exhibit will not be the least realistic and interesting on the grounds."

These things are all very good, and without donht the historical feature will be fully developed. In our judgment, it should be made very conspicuous. To the ordinary sightseer the original stamp mill will be quite as attractive as the latest development in that line; the rocker, the long-tom and pan as the concentrator and amalgamator. This part of the exhibit should have some unmistakable reminder of Marshall, Sntter, Bret Harte, and Yuba Bill—gun and all. These things are inseparably associated with mining in California, and no mistake will be made if the general impression of the early history of the industry is thus picturesquely confirmed.

Foundry Notes.

BESINES being engaged in tbe nsual quantity of general work, the Union Iron Works are now constructing the first ten stamps of a 20-stamp mill for the Baradon Mining Company, Gnanaacavie, Mexico. Six pans will be used at present. An 8x16-ft. hoisting engine for the Harqua Hala Mining Company, Arizona, is also about to be shipped.

THE Pelton Water Wheel Co. annonnces that it has acquired by purchase from W. G. Dodd and the Union Works the patents and bnsiness of the Dodd Sigmoidal Water Wheel. The inventor of the wheel is W. G. Dodd, snperintendent of the First street branch, Union Iron Works. It has acqnired much favor among mill-men since its introduction, several years since, and its acquisition by the Pelton Company was brought about, no donbt, by a desire to obtain possession of the best devices and appliances in water-wheel construction. The peculiar merit claimed for the Dodd wheel is in the bucket, which is constructed in sucb manner as to permit the water, after all its energy has been converted into work, to flow from the wheel in natural channels or lines due to the force acting upon it. The bucket is so shaped that the discharge sides are prolonged downward on each side of the propelling jet. The water is received or impinged npon the sharp ridge or wedge in the center, divides, and is discharged at each side below, or at a greater diameter of the wheel than that formed by the line of impact.

THE Pelton Water Wheel Company is now engaged in the construction of four new wheels for the Columbia mill, at Anbnrn, Placer county. The wheels are 6-foot, 4-foot, 3-foot and 18-inch, respectively. The first will be nsed to supply power for an air compressor, second for two Huntington mills, third for the hoisting works, and fourth for the electric plant to light the mine. They will be propelled by 100 inches of water nnder a 420-foot head, and generate 100-horse power. The outfit for four arrastras for Kerr & Co., Sierra City, is also being snpplied. It consists of two wheels (5-foot and 3-foot), a Chinese pump, all ironwork for the arrastras and necessary transmission machinery. Five wheels, two 5-foot, one 2-foot, one 3-foot and one 4-foot, have just been sent to Alaska for the Alaska-Mexican mine, operating in conjunction with the Alaska-Treadwell. A new 60-stamp mill is being constructed there, the machinery being furnished by Fraser & Chalmers. Among other things, a 120-horse power Riedler air compressor, of the type recently described in this paper, will be put in. The mill will nltimately be made 120-stamp, giving a total milling power of the Alaska-Treadwell and the Alaska-Mexican of 360 stamps. Five wheels have likewise just been shipped to Juneau, for the Nowell Mining Company, where a mill of 60 stamps has lately been erected. A single 5-foot wheel has been furnished the Utica (Ward) mine, Boulder county, Colo. It will be propelled by 360 inches of water under a 580-foot head, making 370 revolutions per minute and providing 500-horse power. A Riedler air compressor is being pnt in at this mine. Seven wheels have just been furnished the Redlands Electric Light Company, where a new tri-phase system is being installed by the General Electric Company.

Slickens.

THE Candelaria mines of Mexico made a recent shipment of bullion valued at $36,000.

IT is expected that the Harqua Hala Mining Company will soon declare its first dividend since its acquisition by the English company.

So many men bave applied for work in the Cœur d'Alene mines that owners are discharging men they don't want and employing others.

J. H. PACKARD, superintendent of the McCabe Mining Company, Arizona, died at Big Bug, Oct. 18th, of pneumonia after an illness of only four days.

THE Gem mine at Wallace, Idaho, resumed work Oct. 16th with 25 men and the Frisco with 40 men. If the price of lead goes up, more men will be put on.

MR. FRANCISCO DE P. MUNOZ, delegated by the United States of Colombia to investigate California mining methods, has arrived in San Francisco in pursuit of bis mission.

A MILLION dollars in gold will weigh 3686 ponnds and a fraction. If in "seventy-cent silver dollars." its weight will be 56,931 ponnds avoirdupois, or nearly 28½ tons.

THE Napa Consolidated Quicksilver Mining Company of Napa county, California, paid its fifty-sixth dividend, at the rate of 10 cents per share, amounting to $10,000, on October 2d.

THE Amador County Supervisors have appointed a committee of three, and the Miners' Committee a committee of the same number, to make a display at the Midwinter Fair.

A SYNDICATE is abont to commence developing the large coal fields in Sonora, Mexico, recently leased for a long term of years by Mr. Lyons, the well-known San Diego speculator.

W. S. KEYES, vice-president of the Mining Bureau and a well-known mining man, left for Mazatlan, Mexico, October 26th, to remain nntil spring. He is interested in tbe development of the Guadalonpe mine.

THE Pilot Peak Mining and Milling Company has been incorporated. Directors—M. E. Sanborn, P. T. Turner, J. N. Turner, E. W. Abbey and A. H. Hewitt. Capital stock, $100,000, of which $81,000 has been snbscribed.

THE Catalina Mining and Milling Company has been incorporated. Principal place of business, Los Angeles. Capital stock, $200,000, with Geo. W. Prichard of Las Vegas and J. B. Wagner, W. R. Bacon, L. J. Banks and R. D. Wade of Los Angeles as directors.

A MINING location notice was recently recorded which reads: "I hereby claim 1500 feet of this ground np Big Squaw Ravine in a wobbly direction." The locator desired to follow the course of the ravine and could not do so by reference to any points of tbe compass.

A PORTION of the Midnight Mining Company's property in Nevada City has been sold by tbe sheriff to satisfy a judgment of $1529.90 and costs, against W. H. Conley and others, and in favor of Mary E. Gray and others. It was bid in by Edwin Tilley for the above amount.

A RUPEE contains 180 grains of silver, and an ounce of silver will make a little over 2½ rupees. The value of the coin is affected by the fluctnations in the price of silver. Its normal value in the London market is 11d, but falls far below those figures during times of silver depression.

THE San Juan Mining Company has been incorporated. Principal place of business, San Francisco. Capital stock, $24,000, with F. A. Schueider of Santa Clara county, Jose I. Moraga of Santa Barbara, Charles Cranz Jr., Wm. S. Cranz and H. W. Schram of San Francisco as directors.

THOS. JENNINGS, the well known middle-weight upper drill miner of Colorado, has challenged Thos. Nianes, late of Montana but now of Nevada City, to an upper double-handed drilling match, to take place inside of 30 days, for $100 a side. The match will probably take place at Nevada City.

CORNELIUS RILEY, of this city, interested in the Alison Ranch mine at Grass Valley, says that arrangements are being made by Mr. Davis (the owner of the mine) and others to commence work in the spring. In the meantime matters concerning the Alison Ranch are nearly as they have been for years.

AN aerolite has just been dug np in Yakima Valley, Wash., which fell three years ago. The meteor weighs 12½ ponnds. Imaginative spectators maintain that an angel's face is plainly outlined npon one side of the concave formation; bnt, unfortunately, proof of the celestial character of the aerolite is still not quite complete.

THE Dictator Gold and Silver Electric Mill and Mining Company has been incorporated. Principal place of business, San Francisco. Capital stock, $500,000, with W. H. Swedaker, W. H. Gender, C. A. Stockton, E. McGrath and W. D. Sanborn of San Francisco, E. F. Burks of Los Gatos and F. H. Kellogg of Alameda as directors.

THE editor of the *Examiner* in his answers to correspondents says that no measure has passed Congress for the relief of miners in assessment work. He is mistaken. The measure passed the House, and was also passed by the Senate with an amendment excluding corporations from its benefits. The matter rests there at this writing.

COLONEL W. R. WALLACE, who gave his name to the town of Wallace in the Cœur d'Alenes, and, as its owner, was once worth a quarter of a million, afterward by a turn of fortune being reduced to a financial zero, is again on the "sunny side of Easy street." He is now acting as superintendent of the Ophir gold mine, in Ontario, holds a one-tenth interest in the property, and is reported to have "struck it rich again."

A WASHINGTON PAPER somewhat crudely describes a fine-gold process in the following: "Speaking of saving fine gold brings to mind a process for saving it made recently, part of which is original, the invention of B. E. Craig. It is what he calls

a settler, which is composed of small-sized water pipes placed close together in a tight box, running lengthwise of it, and is somewhere about ten feet long, which he intends to put in use in a few days over at Priest rapids."

TUOLUMNE county is moving to make a fine exhibit at the Midwinter Fair. The best specimens of quartz will be sent. G. A. Richards thus enumerates other features of the exhibit: "There will be a separate exhibit from the noted gold mines. Every variety of marble cubes, slabs, polished and in the rough; granite, soapstone, chrome iron, plumbago, asbestos, copper ores and the various country rocks will be displayed, and there may be some interesting exhibits from our famous caves."

THE Kanaka Mining Company has been organized at Grass Valley. There are 100,000 shares in the company, and all the shares have been subscribed. Following is the board of directors: Wm. Lebar, David Bryan, Duncan Gillis, Wm. Seaman and Thos. J. Mitchell. The officers elected are respectively: D. J. Bryan, president; Wm. Lebar, vice-president; Thos. J. Mitchell, secretary; D. Gillis, Treasurer. The company was formed for the purpose of working a gravel claim at the head of Kanaka creek, near Greenhorn.

THE statement of the Alaska Treadwell Gold-Mining Company for the three months ending Aug. 31st is as follows: Receipts—Gold bullion sold, $200,431; interest received, $72, equal $200,503. Disbursements—Mining 59,290 tons of ore, including deadwork, $34,496; milling same and saving 1175 tons concentrates, $21,291; chlorination, treating 1098 tons concentrates, $8965; general expenses of all kinds, $3381; bullion charges, freight, etc., $2924, equal $71,068. Profit available for dividends, $129,435. The total cost per ton during above period has been $1.20.

THIEVES have been at work in the Mining building at the World's Fair. The Secret Service men suspect that an organized gang, composed of employes, has found lodgment in the building. F. D. Schermerhorn, superintendent of the Idaho mining exhibit, the other day found one of his cases open and valuables worth $3000, and under bond for $2200, missing. The big brick of refined silver owned by the De Lamar Mining Company of De Lamar, Idaho, 32 carats of opals, finished for setting, and two cut and several uncut rubies were gone.

THE gold fields of the Transvaal Republic in South Africa yielded over 136,000 ounces in August, which is the largest product yet recorded in any one month. In round figures a year's product at the same rate would be worth $32,500,000, which is about equal to the annual production of gold in either the United States or Australia. If the Transvaal mines produce $30,000,000 in 1893, there will be nearly $40,000,000 worth of gold mined in 1894 in all probability. It is impossible to tell where the top limit will be reached, but it is probably not many years off.

THE proposition of the silver-mine owners to the miners at Aspen, Colo., looking to the resumption of operations, is as follows: When silver is 80 cents an ounce for a month the miners will receive from $2.50 to $4.50 a day, according to the class of work. When silver is 82½ cents, 25 cents a day will be added. When silver is 85¼ cents, then 50 cents a day will be added. The acceptance of this proposition would give work to 700 men. Over 1000 returned to work in the Leadville mines recently on the same scale. The Aspen miners refused to accept the terms.

SINCE the agreement between miners and mine-owners went into operation in the camp, says a press dispatch, Creede has rapidly recovered its former tone and business thrift. The output, while less in dollars than formerly, is holding at this time nearly the old quantity in tonnage, and the mines are employing close to the old quota of men. In addition development work is being gradually resumed in all divisions of the camp, and unless something now unforeseen develops in the silver situation Creede will go through the winter at something near to the old pace.

NEVADA COUNTY proposes to make an exhibit at the Midwinter Fair separate from the State exhibit. The general Executive Committee is in receipt of information to the effect that the commissioners appointed by the Board of Supervisors (Messrs. George Fletcher, R. L. Thomas and B. M. Shoecraft) and the commissioners appointed by the State Miners' Association (Messrs. S. P. Dorcey, George Mainhart and Fred Zeither) have applied for 6000 feet of space for the purpose of making a creditable display. A special feature of the display is to be the early placer mining methods.

IN speaking of the fineness of Cripple Creek gold, Theo. F. Van Wagenen says: "The gold found is of remarkably pure nature. It will mint close on to $20 per ounce, and bars have been sold which brought $20.40. Cripple Creek is almost on a straight monometallic basis. The amount of milling ore already uncovered and broken is something very remarkable. In several of the mines it stands 10 to 20 feet thick and even more, and careful sampling indicates that it will mill from $5 to $20 per ton. I believe there is ore developed in this camp to date to run a thousand head of stamps for a couple of years."

THE Deadwood *Pioneer* tells how a prospector in Potatoe Gulch makes his tests: Take one pound of pulverized ore, put in a vessel, add water sufficient to saturate and cover one-half inch, add four ounces of salt, boil twenty minutes, then continue at a slightly lower temperature until the pulp is reduced to dryness, stirring continuously. As soon as dry increase the heat until the pulp is red hot, then dash the same in a gold pan containing cold water, pour in three drops of quicksilver and then pan it down, retort the quicksilver and you have the gold. Rub the pulp with the fingers on the pan while panning.

A RECENT steamer from China to this port brought 10,000 sacks of coal from Tonquin, China, for which the owners of the mine are trying to open up a market. It is put up by a patent process in the shape of large bricks, or "briquettes" as they are termed over in China, the bulk of these briquettes being coal dust and disintegrated coal compressed by hydraulic power into the smallest possible compass. Wonderful economy in the generation of steam is claimed for it, and with the cheap labor used in the manufacture the promoters think they can successfully compete with coast, Scotch, English and Australian coals. A large cargo of Japanese coal is said to be on the way here, but several experiments of this sort have been made before without startling pecuniary results. The Tonquin miners have been at work perfecting their briquette-making process for a number of years, and now that it is completed they are hunting a market.

THE resumption of the mines in the Coeur d'Alenes, says the Spokane *Review*, presents startling figures when the quantity of other transactions it involves and the amount of money it adds to the wealth of the people is considered. In round figures it means $100,000 per month more paid to workingmen directly, and indirectly to industries that support as many more families as the payrolls of the mines themselves. The 700 men who will go to work on the mines already in operation by this time will be increased to 1000 before many days. At the lowest wages, $3 per day, with a goodly number receiving $3.50, and a few even more, the round figures are reached without the necessity of exaggeration.

Big Chlorination and Cyanide Works.

Some idea of the scale upon which treatment of tailings and concentrates is undertaken by one company in South Africa may be obtained from the directors' report to the Central Ore Reduction Company, of which Mr. Charles Butters, formerly of Shasta county, California, is managing director. The custom works embrace a complete equipment of chlorination plant, with a capacity of 3000 to 4000 tons of concentrates per month, but which is so constructed that its capacity will be doubled by the erection of one more furnace; four cyanide stations complete and in working order with a capacity of 20,000 tons per month, and one with a capacity of up to 15,000 tons per month in construction. The chlorination plant and buildings, and the stationary cyanide plant No. 4 form the central works, to which are attached the workshops, such as carpenters' shop, foundry, fitters' shops, the offices, staff and workmen's quarters, boarding-house, stables, and Kafir compound, as well as the manager's house, the whole pile of buildings covering an area of 40 acres. The other works are movable and extend over the reef 14 miles.

The stock of tailings bought by the company amounts to 350,000 tons while contracts have been concluded for a further quantity of about 200,000 tons. As the present working capacity is 19,000 to 20,000 tons, which will be increased on the completion of No. 5 plant to over 30,000 tons per month, there is sufficient work on hand for at least 18 months. The company, however, is not going to stop at this, but intends further large extensions, both in cyanide and chlorination works.

The total quantity treated, practically in four months, has been 1382 tons of concentrates and 33,500 tons of tailings.

The output of gold was 13,382 ounces, valued at £47,219.

The average value of cyanide bullion has been £3 2s 7d per ounce; that of chlorination gold £3 17s 8d per ounce.

The actual net profit in four months to the company, allowing for everything (interest charges, wear and tear, labor, extra initial expenses, etc., etc.), has been £4202 5s 3d ($21,000) upon an actual investment of £57,550 ($270,000), or somewhere in the neighborhood of 20 per cent per annum. It is believed that results for the present year will fully justify the expectation of a large profit.

The entire plant has been erected upon the designs and under the supervision of Mr. Charles Butters (late of the Robinson Gold-Mining Company), with whom the board has concluded a five-years agreement as managing director, securing to him, besides a fixed remuneration, a substantial interest in the profits and also in the capital of the concern. The board testifies, in its report, with pleasure, to the amount of energy and untiring zeal with which, in a very short time, these important works have been erected by the managing director, and to which it is due that the first year of the company's history a satisfactory rate of profit has already been earned.

The Comstock Tunnel Company.

The fourth annual report of the Comstock Tunnel Company for the year ending August 31, 1893, has just been issued from the office of the company in New York. The following are extracts:

"The capital stock of the company is $1,000,000, viz., 2,000,000 shares of $1 each, par value. The funded debt of the company, consisting of first mortgage, four per cent, non-accumulative income bonds, remains the same as at the date of our last annual report, viz., $1,908,000. The unissued bonds in the treasury remain as last reported, viz., $861,000. The company has no floating debt, except a balance to become due for legal services in the pending litigation. During the past fiscal year there was declared as applicable to the payment of coupon No. 7, maturing November 1, 1892, the sum of $28,620. Coupon No. 7, maturing May 1, 1893, was passed. Coupon No. 8, maturing November 1, 1893, will also have to be passed.

"The year has been an unsatisfactory one for the company. The general conditions which have brought about this result are too well known to require extended comment. The product of the mines, from which our income is mainly derived, instead of increasing, as we had hoped, has steadily diminished. Against the small tonnage (152,809 tons) and the small gross yield ($2,427,000) for the fiscal year ending September 1, 1892, the tonnage for the year covered by this report has been only 91,423 tons, yielding only $1,653,222.19. The last mentioned amount must be diminished by $571,815.81 (the discount on silver), making it $1,081,406.38, and it is on this that our royalty is calculated. With silver at par, our royalty would have been greater by $14,872.63, no inconsiderable amount in times like these.

"Unfortunately the two elements which tend to reduce our receipts will always necessarily go together; the lower the price of silver, the more it discourages, and hence the smaller the production. And yet it should not be so in regard to the Comstock mines, especially some of them, as their yield consists so largely of gold. During the past year the royalty-paying mines produced $688,111.36 in gold against $963,930.93 in silver, figuring silver at par. While it is true that the loss in discount on the silver yield was as much as 39 per cent, yet taking into consideration that the gold sold at par, such discount on silver renders the average percentage of loss on the entire product only 22 per cent. Some of the mines produced more gold than silver, even figuring silver at par, the yield of the Consolidated California and Virginia mine having been $310,637.40 gold against $247,881.43 silver; and that of the Belcher $65,837.00 gold against $55,536.71 silver, while the Kentuck produced $7,233.99 gold and $7,211.12 silver. In some of the mines, such as the Crown Point and Yellow Jacket, large bodies of low-grade ore containing only gold are known to exist."

The feature of the Comstock ores—their gold-bearing quality—is the hope on which, in view of the present and prospective low price of silver, their continued extraction mainly rests. If the assay value of the large bodies of ore which are known to exist was greater, there would be no reason to doubt that the mines could be kept in active operation for an indefinite period of time. The question is whether this last mentioned result can be attained in view of the alleged low grade of the ore. In our opinion, as already so frequently expressed in the past, this question must be answered in the affirmative, *provided the expenses connected with the extraction of the ores are reduced to the lowest possible basis, and such extraction is carried on in a businesslike manner.*

Placer and El Dorado.

TO THE EDITOR:—The mining outlook in Placer county seems to be somewhat brighter at the present time than it has been for some time past. The work of erecting buildings and getting machinery in place at the Three Stars mine is progressing rapidly. White & Thorpe, proprietors of the Moore mine on Duncan Hill are taking out some very rich ore. Twelve hundred dollars in specimen rock was taken out of this mine one day last week. The Smith Bros. are prospecting for a new pay chute in G. J. Morgan's mine, which is also situated on Duncan Hill about a mile and a half below Auburn. This mine and others situated on the hill have yielded considerable money in the past and promise—with judicious management—to become good paying properties in the future. The most of the gold yielded by the quartz mines in the vicinity of Auburn comes from pockets and nearly all of the runs in this slate formation are of a pockety nature. This section of Placer county, like many more places on the coast, has some fine ledges upon which, if a few thousand dollars were judiciously spent in development, handsome profits would be returned.

It may be truthfully said that the mineral resources of Placer and El Dorado counties are yet only in the infancy of development. While it is true that most of the shallow placer diggings are pretty well worked out, still there is untold wealth in gold locked in the ledges, pockets and seams that fed those placers. It requires prospectors, of good judgment, well versed in their calling, are not afraid of hard work and "roughing it," to discover the source from which the gold came that made the ravines and gulches so rich in some localities. When half of the ledges that liberated part of their wealth to make those placers is discovered and worked, then the output of gold will be greater than ever known before in California's palmiest days.

In El Dorado county some of the old quartz mines that have been worked in former years with but poor success are now being worked to a profit. Notable among these is the Taylor mine, near Greenwood, which is now one of the standard mines of the county. On my recent trip through the northern portion of El Dorado, I find that, like in Placer county, there is more prospecting for quartz being done than formerly, and the outlook for the future prosperity of the mining industry there is good to say the least.

Auburn, Cal., Oct. 21, 1893. ALEX QUARTZ.

Studies in Gold-Milling.

NUMBER V.

[Written for the MINING AND SCIENTIFIC PRESS by J. A. Edman.]

Experience has shown that the size and shape of grain produced vary much from different styles of crushing machines, stamps generally producing much fine sands and slimes, while rolls give a more uniform product and of a size more in correspondence with the screens used. In shape the particles also vary, the rolls producing in hard rock a large proportion of thin and splintery particles, while the stamps furnish more of rounded grains. So in grinding, different machines produce widely different sizes, but not so great a variety in shape of grain, this being mainly determined by the relative hardness of the ores.

As in the preceding pages of these studies, it has been shown that in most gold ores, and in decomposed ores particularly, the gold exists in an extreme division, and consequently when mechanical reduction is attempted, the best means should be employed for that purpose. It becomes of the utmost importance to ascertain the merits of the different machines used for grinding purposes as distinguished from coarse and fine crushers. Granting that rolls and stamps will economically reduce hard ores to 20-mesh*, what machine now known is best fitted to take this or any larger size and reduce it to such dimensions as will effectually set free the gold from its matrix and allow it to come in full contact with mercury under the best conditions for successful amalgamation?

Leaving out of the discussion the many forms of rapid grinders which do not attempt amalgamation, and most of which can only handle hard and dry material, the contest will eventually be between machines of which the grinding-pan and the arrastra are types. And here, although the grinding-pan undoubtedly was evolved from the arrastra, a wide distinction must be made between these two types of grinders as they now exist. The arrastra from ancient times used as a crusher and grinder combined has only of late years come into its proper office as a grinder, and consists essentially in all its present forms of a circular bed of varying diameters, paved with hard rocks for a bottom, on which the grinding is performed by heavy flat rocks from two to four in number, generally called drags, and from 600 to 1200 pounds in weight, moving slowly in a circular path and actuated from a vertical shaft with arms. The rim or curb of the arrastra is formed of rock or wood.

The pan, on the contrary generally of iron or with wooden sides, consists of a cylindrical vessel from two to six feet in diameter, having dies of hard metal fitted to its bottom, while the grinding is performed by iron shoes fitted to a muller and carrier, also driven from the center and generally at a high speed of 50 to 75 revolutions.

Widely differing in construction, as much variation appears in the material on which these machines operate, the arrastra taking rock up to two inches in size, while the pan does most of its work on sands already crushed to 20 or 40 mesh. In their products they approach each other, as both can deliver sands and slimes up to and below 1-1000 inch in diameter.

Since the discovery of the Comstock lode and the adoption of pan amalgamation on most of its ores, the grinding pan has undergone many modifications and improvements and has attained a high state of efficiency, principally as used in silver mills. Among the best forms now met with in gold milling the special grinding and amalgamating pans used in the Boss system deserve mention for perfect design and efficient work. For grinding in charges the Combination pan still maintains its place. In the early years of California gold milling before concentration became general, the great loss by ordinary battery and plate amalgamation and even by blanket concentration, led to a system of grinding partly concentrated tailings which in the larger mining camps, such as Grass Valley and Nevada City, became quite a lucrative industry and gave work to many small custom mills, the gold product generally being derived from the quartz sands carrying fine gold. For this purpose the simpler and inexpensive forms like the Knox pan were then in use. By these means the various styles of grinding pans have become well known to the mining public, especially of the Pacific coast, but even yet gold miners have been slow to avail themselves of their benefits.

In bringing before gold miners the merits of the arrastra it must be understood that the best modern form is intended, and not the ancient styles yet in use in Mexico and Central America, nor those scarcely more modern yet used in California and derived from ancient patterns taken from mills existing on the Italian slopes of the Alps, and operated on this coast chiefly by Italians. Neither is it intended to cite the attempts, generally abortive, to combine the arrastra and grinding pan in a composite machine. The most efficient modern arrastra may be described as a circular bed of from 10 to 12 feet in diameter, paved with cut or well dressed hard and coarse-grained rock like granite or syenite, laid in cement with spaces about an inch wide between bedstones and radiating from centerpost to rim. A centerpost of rock or wood is provided, and a curb of rock or tough wood, protected on the edge and inside by heavy iron plate. An upright iron shaft, with its lower end running in a step let into the centerpost and with its upper end moving in a box secured to a heavy crossbeam, is furnished to a heavy flange keyed to the shaft and to this the arms are attached, the flange being capable of being shifted on the shaft at least a foot. The ends of the arms are braced by rods with swivels, attached to a collar at the upper end of shaft. The drags, from 600 to 1200 pounds in weight, are attached to clamps on the arms by chains fixed to drags by heavy iron pins driven driven into wood plugs set in holes in the drags, and not less than two chains for each stone. The chains are fastened in hook-bolts fitted to the clamps, which slide on the arms, by which means both a vertical and horizontal adjustment of drags is effected. The motive power is water or steam applied from the horizontal to the upright shaft by means of spur or bevel gear, and the revolutions, according to diameter vary from eight to fifteen per minute.

As the arrastra is strictly a grinder the rock fed to it should be crushed by jawbreaker to an average size of one-half to three-fourths of an inch. The most rapid work is done on material from one-half to one-twentieth inch, below which the reduction proceeds slower. In general practice the ore is ground in charges of about 1000 pounds, fed gradually during one or two hours, and the fine grinding continued for two to four hours more. The mercury is introduced when the pulp is ground to a coarse sand (about eight mesh), in quantity enough to make a rather stiff amalgam. When ground to fine sand or slime of from 1-500 to 1-1000 inch diameter of grain the pulp is diluted until a point when the slimes are kept in suspension but the bulk of amalgam settles to the bottom and lodges in the spaces between the bedstones. This point is ascertained by frequent horning of the pulp and requires some skill for its proper management. The pulp is discharged by a gate in the rim of the arrastra and should be run into a settler where it is further diluted, and the finest amalgam with heavy sulphides and some sand is saved for subsequent treatment.

A well-fitted arrastra of the above description will handle from two to three tons of moderately hard quartz in 24 hours; of soft rock from 20 to 40 per cent more, and reduce the ore to an average size of grain of 1-1000 inch. If fitted in pairs, two such machines are generally attended by one man on a 12-hour shift and the cost of grinding and settling varies from $1.25 to $1.75 per ton with water power independently of the cost of the coarse crushing which is small, if a large plant is used.

The first cost of such arrastra is less than a first-class modern grinding pan, and should not exceed $300. A wooden settler capable of handling pulp from two arrastras can be erected for $250 inclusive of driving gear. A plant of ten arrastras with five settlers would cost about $4200, and with a small rock breaker, Pelton water-wheel, line shaft and pulleys, not over $5500, and could work thoroughly from 20 to 40 tons per day according to character of ore.

Attempts to run the arrastra continuously have failed, as the pulp passing over them contains much coarse sand, and screens cannot be used successfully.

The rapidity and quality of grinding is determined to great extent by the nature of the grinding surfaces, both in arrastras and pans. For extremely fine grinding, smooth and hard surfaces are required, and the most thorough mechanical reduction known to the writer is effected in an agate mortar, by which a size of grain of 1-3000 inch can be obtained. When a very fine grinding, as to 1-2000 inch grain, becomes necessary, the operation should be performed in two grinders, the first making a product of fine sand, the second producing an impalpable slime. For arrastra grinders the following rocks will answer, beginning with the coarsest: Coarse-grained granite or syenite; fine-grained granite; coarse-grained quartzite; fine quartzite; tough, massive quartz or hornstone. For pans: Coarse-grained cast iron; chilled iron; hard cast steel.

Long-continued experiments by the writer have shown that a reduction to 1-1000 inch is generally required to set free most of the gold contained in quartz, talcose schist and oxidized pyrites, and in some instances a reduction to 1-2000 inch grain may be needed. When it is considered that the average-size grain produced by a stamp mill is about 1-100 inch, one source of the great loss under present milling systems becomes apparent.

To approximately determine the relative percentages retained by rich sands, ranging in size from 1-40 to 1-1000 inch in diameter, a small lot of rich plate sands from a quartz mill was taken, of a nearly uniform size of 1-40 inch, and subjected to grinding to various sizes, for each of which the gold contents were determined by fire assay, the gold set free being carefully eliminated at each distinct step of the treatment. The results are shown in the following table, where the gold contents of the sand at 40 mesh is taken as the standard, or 100 per cent.

Size of Grain.	Relative Gold Contents.
At 1-40 inch	100%
At 1-100 inch	93
At 1-200 inch	76
At 1-300 inch	49
At 1-500 inch	29
At 1-750 inch	13
At 1-1000 inch	6
At 1-1600 inch	But a few colors were visible under the microscope

The sand treated consisted of quartz 90 per cent, with talcose slate and nearly 5 per cent of oxidized pyrites. The grinding was done in an iron mortar down to 1-500 inch, below that in an agate mortar. Sizes were determined by sieves to 1-200 inch, and below that size by microscopical measurements.

A simple experiment to determine the effect of fine crushing can be made by grinding rich sands or concentrates in an ordinary iron mortar with a smooth bottom, using tepid water to which a little caustic potash or soda has been added, and very little quicksilver, enough to make a pasty amalgam. With moderately fine grinding, this will give a small lump of amalgam. The slimes, carefully saved and reground in an agate mortar until most of the mineral matter will remain in suspension for some minutes, will yield another globule of amalgam varying in size according to the diffusion of the gold, and often being from 20 to 40 per cent of the amalgam from the first grinding.

J. A. EDMAN.

*Mesh when here used indicates number of holes to the linear inch.

Hydraulic Fields of Southern Oregon.

Prof. Leigh Harnett, a mining man well known in Oregon, is of opinion that the hydraulic territory in southern Oregon, from Canyonville to Ashland, is the richest and most continuous on the coast. Says Mr. Harnett:

"From the earliest days it is a matter of history that out of the placer mines of southern Oregon fully $40,000,000 have been taken up to the present time. This large sum was taken from such small portions of the low-lying ground that could be reached by water and worked by sluices. To-day, in Oregon, as once in California, a sufficiency of water is the great consideration; that is, to put under systematic operation the whole range of the rich placer fields of our State, especially the portions suitable to the great hydraulic system. When that day comes Oregon will be the banner gold-producing State of the Union."

The gold flow Mr. Harnett refers to he says is fully 200 miles long without sensible break or intermission. This, he contends, is proved by two facts—the similarity of the gravel formation and the result of the hydraulic pipe wherever water, in even limited quantity, could be obtained at any point of the 200 miles. During the present season there has been an unusual supply of water, and the cleanups, the best of all evidences, have been proportionately good, while all were in advance of past years. Messrs. Sturgis and Hall and Beck, near Grant's Pass, respectively, cleaned up $20,000 and $10,000 clear profit. Below them, the Humphrey and Sterling mines, with the best hydraulic plants, perhaps, in the State, are still to be heard from. The claims on the whole line, at from 10 to 20 miles apart, are under pipe, and therefore the whole length is now really developed beyond mistake—a most important point.

This question of sufficiency of water for thorough work Mr. Harnett hopes soon to prove. Last summer he formed a company in Portland, called the South Umpqua Hydraulic Mining Company, and they have since done good work. The ditch, ten miles long, with a carrying capacity of 5000 inches of water, is surveyed, the whole territory carefully prospected, and a sawmill put up at the head of the mines is now cutting lumber for their dam across the Umpqua and such portions of the ditch as will have to be flumed. Mr. Harnett thinks that the whole of his company's ground is good for five cents a cubic yard. There are two other ditches being surveyed, one 35 miles long and 400 feet higher than the one first mentioned. This ditch belongs to San Francisco men and is intended for lumber as well as mining. Farther south, at Graves creek, John Lewis, of Portland, has commenced an extension for a better supply of water next season.

It is fortunate for southern Oregon, Mr. Harnett thinks, that California has resumed the hydraulic system on a large scale, for when these three ditches are turned over the placer ground and show its real value, large sums will come from California to Oregon. The people of that State, says the Professor, will never lose their love for hydraulic mining, more particularly where the debris question, as in Oregon, can never exist to any extent.

Treatment of Copper, Lead, and Gold and Silver Ores.

[Extracts from Paper on American Improvements and Inventions, Read before the American Institute of Mining Engineers at its August Meeting, Chicago, by James Douglas of New York City.]

The particnlars in which methods of copper smelting have been modified, through modifications of the plants, bave already been described.

Of our two large Eastern smelting establishments, the Baltimore Company follows, in the main, the Englisb methods of reverberatory smeltiug, and treat their argentiferous product partly by conversion into binestone.

The Orford combines cupola practice witb reverberatory concentration, and is contemplating the erection of an electrolytic plant. The Lake establishments melt and refine their conceutrated ores at one operation iu large furnaces modified in desigu to fulfill their special requirements.

At the Arizona carbonate mines all the copper is made by one fusion in water-jacketed cupolas, the matte, which is produced simultaneonsly in greater or smalier quantity, being generally kilu or heap-roasted and added to the ore charge. The pyritic ores of the Verde mines are heap-roasted, matted and conceutrated in converters. In Montana, the ores of Butte, which receive almost without exception preliminary concentration, are in most works roasted in one of the previonsly described mechanical calciners and matted in reverberatory furnaces, the ore being in some works passed hot from the calciner to the reverberatory. The Parrott Company, under the progressive guidance of Mr. Franklin Farrell, were the first in this country to Bessemerize matte, and undonbtedly the first anywhere to make as much as 14,000,000 pounds of copper a year by the pneumatic process. Now all the large Montana works are adopting the same speedy method of matte conceutration, and raising 50 to 60 per cent matte up to 97 per cent black copper at one blow, in the deep converter with elevated tuyers; though, I understand, the bottom tuyers have been used as successfnlly with a very strong blast. The Bessemer pigs of the Parrott works are electrolyzed at the Bridgeport works of the same company, and steps are being taken by all the other copper companies of the Butte district to separate the precious metals and refine the copper by electro-deposition.

The only large concern the sole aim of which is the treatment, apart from the mining, of argentiferous and auriferous copper, is the Boston & Colorado Smelting Company, of Argo, Col. The method employed for tbe extraction of the silver is the Ziervogel; that for the extraction of the gold from the copper bottoms is maintained a secret.

Apart from the argentiferons mattes of Bntte and Arizona, and those made by the Boston & Colorado Company and their affiliated company in Botte, and separated at Argo, most of the precious metal copper matte issues as a by-product from the lead fornace. The silver of the San Juan, Dnrango and other districts of soutbern Colorado is more or less associated with copper glance, and copper is becoming more abnndant in the Leadville ores, and thereby so increasing the snpply of copper-lead matte as to bring Colorado into greater prominence as a copper producer. Argentiferous copper is also imported in considerable qnantities from the Sierra Mojada of Mexico. The copper-lead mattes are treated by electrolysis, at their own works, by several of the lead-smelting companies.

The Pueblo Smelting Company have, after extended experiments, carried into practice a very interesting method patented by Mr. John Crook. The steps of the process as I saw it at first practiced are as follows :

1. The ground matte is immersed repeatedly in a bath of lead, maintained at a temperatnre below the fusing point of the matte, which dissolves a very large percentage of the precious metals.

2. The matte is skimmed from the lead bath and snbmitted to so-called scorification on tbe hearth of a reverberatory. The excess of lead flows off and the volatile constituents of the matte are so thoroughly evolved that, from a very arsenical antimonial matte, excellent copper is made, and the copper and iron are reduced to a sponge.

3. This sponge is fosed with silica, and copper results. Particulars are not published as to the consumption of lead and exact extraction of gold and silver, but the method embodies a nomber of novelties of the greatest interest to chemists and metallurgists.

The Kansas City Smelting and Refining Company are preparing to extract the copper from lead matte by a metbod which I worked out in association with the late T. Sterry Hunt. It depends on the action of snlphnrous acid on copper snlphate, in sointion witb a snfficiency of chlorine to prodnce cuprous chloride. This pure copper salt, insoinble except in a strong chloride solution, readily separates on the injection of sulphurous acid gas from a roasting furnace. If the gas be not diluted by too mnch air, acid is simultaneously generated in excess of the equivalent qnantity, due to the unavoidable, and in this case desirable, presence of some free oxygen in the injected gases. The sub-chloride can be reduced by iron to cement copper and the chlorine recovered as cbloride of iron, or to sub-oxide by lime and the chlorine recovered as chioride nf calcium. The precious metals remain with tbe lron oxide in the matte residues.

There has been, however, but little patronage extended to wet copper methods, mainly because we do not possess, within accessible reach of the chemical centers, any large bodies of cupriferous pyrites, whose residues, after the extraction of sulphnr and copper, would possess value as an iron ore. The treatment of the low-grade oxidized ores nf the southwest by lixiviation is awaiting realization.

In tbe past various attempts have been made to employ old and new wet methods but none have proved commercially snccessfnl nor bave any survived till to-day.

Bessemerizing, as a method of concentrating copper matte, is rapidly displacing the older and slower processes; but with us the machinery does not differ notably from that in vogue abroad. Here, as in Europe, attempts are being made, and with more snccess than there, to utilize the heat generated by the oxidization of sulphur and iron, and thus smelt pyrites without fuel, and also to Bessemerize and smelt at one operation, as was essayed by Hollway, in 1879, in cnpolas of special constrnction. Whatever improvements have been made in the electrolysis of copper are kept secret.

Lead.—American practice in lead smelting is distinguished rather by tbe quantity of work got out of a plant of a given size than by any marked departnres from European methods.

The larger lead fornaces, invariably water-jacketed and driven with a higher blast than of old, smelt in some cases more than 100 tons of charge per fornace, and yet, through skillful metallurgical handling and close attention to slag composition, do work which will compare in perfection with the best in Europe.

Onr prominent lead smelters have bronght more accurate scientific training and acumen to bear on their professional labors than perhaps any other class of the fraternity; yet, withal, their science has not dwarfed their inventive faculties or made them slaves to the teaching of the schools.

Reverberatory smelting in the English type of furnace is little, if at all, practiced in this country. In Mississippi and Missouri, a modified Carinthian hearth, known as the air furnace, is credited wlth producing about 10 per cent of the lead from that region, while over 60 per cent of the pnre lead ores of the Mississippi valley are reduced on a hearth, which differs from the typical Scotch hearth in being water-jacketed, and therefore capable of continuons running.

At the Lone Eim Smelting Works the Lewis & Bartlett process of collecting the lead fumes in bags has been adopted and the heavy losses of this system of smelting have been reduced. The fornaces which prodnce 174,626 tons of onr total of 205,626 tons of lead are large cupolas, growing ever larger, originally designed on the Raschette model, then verging toward the Poltz, and finally reverting to the Rascbette type. They are now so modified in essential details by each smelter that no single fornace can be taken as the exact pattern of the whole. A standard size is now 42 by 120 inches. All are built with a bosh and are jacketed within the zone of fusion. Most are provided with an Arents syphon tap, a discharge built into the crucible wall and communicating with the bottom of the lead well; in all, the superstructure is supported on pillars to facilitate tbe removal of defective sections. In most coke and charcoal mixed is the fuel, but in one instance at least uocoked lignite, mixed with very poor coke made from the same lignite, is used very successfully. Most are fed by hand; some throngh thimbles. In most cases only tbe dust and fume that will collect in long flues is saved; in other cases, sheet-iron chambers, with large cooling surfaces, are used, and in more tban one the Bartlett method of filtering the fume throngh woolen bags, as in collecting zinc-white, is applied. Preliminary roasting is doue in some works in the O'Hara and Bruckner mechanical furnaces. Mr. Matheson, of the Pueblo Smeltiug and Refining Company, has, it is believed, at last perfected a tapplog jacket which, attached to the ordinary water-jacket furnace, permits a continuons flow of slag and the maintenance of the liqnid charge at a constant level below the tuyeres. While the arrangement of the newer works is essentially American (excellent examples nf which are Eilers's works at Pueblo, Col., and Great Falls, Montana), the works being laid out with a view to the utmost economy of labor and the utilization of the utmost efficiency of tbe machinery employed, the only points to which attention may be directed as distinct American inventions and suggestions are the water-jacketed walls, the Arents syphon tap, the Matheson slag tap and the Bartlett method of collecting fumes. No notable departure from accepted foreign practices or appliances is generally made in the departments of refining and parting, if we except the use of Moebins' electrolytic process for treatiog dore bars.

Gold and Silver.—In the field of gold and silver metallurgy more originality has been displayed and exercised by American workers than in, perhaps, any other.

The gold-mill, with its series of automatic operations, is another offspring of California ingenuity. Manual labor is almost entirely replaced by ocular labor; for superintendence, and not for work, is the function of the mill hands. The ore dnmped into the breakers falls into large bins, whence it slides into antomatic feeders, whicb supply the stamps with regolated quantities. The free gold is extracted partly by liquid mercury in the mortars and by copper plates attached to their sides, and partly on an apron of amalgamated plates, over which the crushed pulp flows as it issues from the battery screen. Automatic vanners receive the tailings, separate the sulphurets and discharge the waste. When the power is supplied by water and the stream is divided to Pelton wheels, coupled directly to the separate groups or even pieces of machinery, the absence of intermediate runniug gear increases not only the sense hut the reality of automaticity, and makes a skilifully arranged and thoroughly equipped California gold-mill one of the triumphs of modern mechanical metallurgy.

The treatment of the iron sulphurets, which, in deep mines, invariably accompany the free gold, and sometimes lock up all the precious metals, has been confined, practically speaking, to two methods.

(1.) Smelting with either lead or copper, or alone with the production of an iron matte. The general experience has been that an irom matte is a less perfect absorbent than either a copper matte or lead. In these departments we can point to no notable improvements or departures from European practice, unless it be in a nearer approacb to success in pyritic smelting.

(2.) The chlorination of gold ores, as proposed and practically carried out by Plattner, including the roasting of the ores, the impregnation of the moistened mass in leach tanks by the chlorine gas, admitted through a false bottom, the extraction of the soluble gold hy water, and of any silver which may have been chloridized by hyposulphite of soda, is the method used at Grass Valley and other points. But the slowness of the operation in stationary vats led Mears to substitnte revolving barrels, whereby not only the chlorination, when gas was injected, could be accelerated, bnt the ingredients for generating chlorine cnuld be agitated with the ore itself. A difficulty encountered in the treatment of gold ores, of leaching the mass of pulp when discbarged from the barrel, has been met by constructing lead-lined iron barrels provided with a filter, using the barrel when revolving to effect the solution, and when at rest as a filtering vat, and accelerating the filtration by pressure. Such barrels are constructed of a capacity of eight tons per charge.

The cyanide method has been applied in some cases with admitted success, hut it cannot claim American parentage.

A Western silver-mill has no prototype in the older European practice. It was a Nevada outgrowth of the California gold-mill, employing the same crushing machinery, similarly combined, but substituting amalgamating pans for battery and apron amalgamation (on account of the greater resistance to amalgamation of silver than gold) and settling pans, in which the mercury is collected from the pulp. As usually designed and worked, the ore passes from the battery into settling tanks, whence it is shoveled, in charges of suitable size, to the pans. In them it is subjected for hours to mercury under the grinding action of iron mullers revolving in close proxmity to iron dies secnred to the bottom of the pans. Live steam is usually injected, but the Boss pans are jacketed. Chemicals (salt and snlphate of copper) are generally added by rnle of thumb, or no rnle at all. They undoubtedly play the same part as in the *patio*, the Krohnke and the Freiberg barrel processes, yielding sub-chloride of copper, which aids in the decompositiou of the silver sulphides; but it is difficult to distribute fairly the effects on the amalgamation among friction produced hy the grinding of iron on iron, heat and the reaction due to the chemicals.

In the Boss system the pulp flows continuously through a series of pans and settlers, the reactions being, it is claimed, accelerated by the thinner layers under treatment in each pan.

The Nevada mill and the Washoe process do quick work, but not clean work.

Where the silver ore, to use a Western term, is so "base" as to resist amalgamation, it is crushed dry, salt-roasted, and may then be amalgamated in pans and

settlers. Barrel amalgamation is not resorted to in any of the large mills.

But in this case the Patera process is sometimes used. It was first exteosively applied by Ottokar Hofmann (to whom is also due the system of rapid trongh lixiviation) in Parral, Mexico, in 1868, and since then has been widely employed, oftener in small establishments or by miners who have extemporized a plant out of old barrels than in large works. The only important modification in the process itself is that made by Mr. Russel, of the Marsac mill, Utah, which consists essentially in the addition of sulphate of copper to the solution of hypo. Mr. Stetefeldt has brought his engineering skill to the aid of Mr. Russell's chemistry, and the resulting plant, as designed and running in the Marsac mill, Utah, contains economical devices for the discharge of the leach tanks, for accelerating precipitation and for the collection and reduction of the silver sulphide.

Labor in South Africa.

The monthly report of the Rand Labor Bureau, Johannesburg, South Africa, shows the following number of men (white) employed in 67 of the leading companies for August, with rate of wages and hours of labor:

OCCUPATION.	No. employed.	Rate of wages in American coin per week.	Hours of labor.
Shift bosses	129	$25 00@30 00	8 to 12
Miners	801	22 50@30 00	8 to 12
Machine drillmen	267	27 50@30 00	8 to 12
Bankmen	90	22 50@27 50	10 to 12
Engine drivers	383	25 00@32 50	8 to 12
Pumpmen	32	25 00@30 00	10 to 12
Stokers	29	22 50@27 50	10 to 12
Carpenters	864	25 00@30 00	8 to 12
Blacksmiths	277	25 00@30 00	10 to 12
Fitters	244	25 00@32 50	8 to 12
Mechanics and painters	23	22 50@30 00	8 to 12
Masons	116	25 00@30 00	8 to 12
Amalgamators	226	20 00@27 50	8 to 12
Cyaniders	59	25 00@62 50	8 to 12
Vannermen	22	25 00@32 50	8 to 12
Trammers	19	25 00@27 50	10 to 12
Clerks	120	20 00@25 00	12
Assayers	49	20 00@50 00	12
Total	3,250		

It appears from this statement that the opportunities for labor in South Africa are greatly limited. It is true that the wages are high, but the cost of living is commensurate with the scale of wages. There is no inducement for laboring men to go to South Africa.

A Trip to Columbia Hill.

Writing of a trip to the San Juan ridge, Samuel Butler says in the Grass Valley *Union:* Columbia Hill, like all other towns situated on the San Juan ridge, has a history replete with interest and romance. Tales are related by the pioneers of thrilling adventures with ferocious animals while searching the placers and gulches for gold. This town is one of the earliest settlements of the upper part of the county. In the early '50's, when men were flocking to the newly-discovered El Dorado by the thousands, eagerly anxious to find some spot where they could accumulate a fortune and return to the home of their nativity, this mountain town was organized. To a stranger unacquainted with the topography of the country it seems wonderful, indeed, that these pioneers should find their way in and out of these hills and ravines in such a remarkable manner; and there is every probability that many an adventurer lost his life meandering in search of gold. I have heard old hydraulickers state that it was no unusual sight to see a crowd of men enter the embryotic town laden with long-toms, rockers and pans—crude utensils employed in the early days to disintegrate the gravel and extract the gold. Claims were taken up everywhere, and the surrounding country was speedily settled. But these pioneers only worked such places as could be successfully developed by the meager and antique tools then in vogue; and when these were exhausted they had to resort to new and improved methods for the purpose of working the large auriferous deposits known to exist there. This resulted in the construction of the incomparable network of ditches, costing in the aggregate several millions of dollars, which is found in the eastern part of the county. It also resulted in the invention of the monitor, which has proved a boon to large hydraulic companies.

Situated at Columbia Hill is the famous Eureka Lake and South Yuba Canal Company's mine. This mine is one of the largest on the ridge and has produced fabulous amounts of gold. For a number of years it was successfully worked, and then came the crash in the form of Sawyer's decision. Under the Caminetti law this company applied for a license to resume, and, after proper investigation on the part of the Government Commissioners, the license prayed for was granted and hydraulicking commenced. This company has a long and expensive system of ditches which supplies it with a liberal amount of water. There are several other smaller mines in close proximity to this town, but sufficient data could not be obtained to guarantee an extended notice.

But while much time and money have been devoted to the perfection of this system of mining, the different quartz ledges existing in this section have not been altogether neglected. With the suppression of hydraulic mining the people who had established homes there began to turn their attention to the system of quartz mining. In this venture they have been fairly successful. In this district is situated the famous Delhi mine. This mine has been very productive and has materially replenished the treasury of its owners. It is located in a deep ravine and the topography of the country is so arranged that the mine can be worked to a great depth by tunnels. The length of the ore chute is from 350 to 400 feet, the lower tunnel cutting the vein at a depth of 525 feet. Some valuable quartz has been extracted from this mine, but on account of the immense body of water encountered sometimes it has been found impossible to work the mine and operations have been suspended. The Enterprise is another mine owned by the same company and situated about 800 feet westerly from the Delhi. This mine is also opened up by a tunnel which runs northeast for 300 feet and then makes a turn and runs nearly southeast, where a large deposit was discovered. This mine has also produced some very fine quartz.

Mining, Wages and Materials in Mexico.

Regarding the wages of labor at Chinipas, in the State of Chihuahua, Mexico, Mr. E. G. Holtham, in a paper read before the Institution of Civil Engineers (British) gives the following information:

The wages of unskilled laborers range ordinarily from 75 cents to $1 per day; and of lumbermen, $1.25; masons receive from $1.25 to $2.50, according to their experience and skill; good foremen, $3 to $4; quarrymen and stonehewers, $1 to $1.50; carpenters, $2.50 to $3, and smiths rather more than this.

Miners receive from $1.50 per day for ordinary drill hands to $2.50 or more for experienced men who can prepare and set timbers underground. These prices are for outside work or for tunnelling when mines are shut down or slack.

The cost of rock-tunnelling varies with the amount of blasting required. Short tunnels in hard rock, six to seven feet square, can be driven for $5 to $6 per lineal foot; longer tunnels, in which the disposal of the stuff is more expensive, or which are driven from shafts, may cost double as much. On the railway, tunnelling in hard rock, 13 feet by 11½ feet in main dimensions, equal to about 4½ cubic yards per lineal foot, cost from $15 in the short tunnels to $20 and $22 in the two longest tunnels (208 and 315 feet respectively) per foot run. Excavation in the open cost from a minimum of 7 cents (contract price) to a maximum of 24 cents per cubic yard in deep trenches for foundations; hard gravel or rock requiring no blasting, up to 50 cents per cubic yard. The hardest rock cost $1.25 per cubic yard, including explosives; and some work among heavy boulders under water cost as much as $2.50. The highest contract price on any large cutting was 94 cents per cubic yard, all labor, tools, steel and explosives included.

Masonry cost, for all labor except mortar mixing, in the most favorable situation, $2.50 per cubic yard of rubble walling. Bridge abutments and high walling, $3.75 to $4 75, and lofty piers, $8.50 per cubic yard. Brick arching up to 15 feet span, including centering and mortar of a special quality, $12 per cubic yard. Concrete rammed in molds, with large stones interspersed, cost $2.50 per cubic yard; laid in bags under water, $6 per cubic yard. Dry stone building in culverts and retaining walls on the railway, quarrying included, costs $1.60 to $2.50 per cubic yard.

The hire of a mule and pack-saddle averages 50 cents per day; the wages of a driver who can load and attend from four to six animals is 75 cents to $1 per day. Donkeys could be hired, including drivers, for 25 to 35 cents a day, the higher figure being paid for those carrying the "bote" or water bags. In the rainy season of July and August all animals run loose, and it is scarcely possible to hire them at any price.

The native generally labors only when compelled by necessity to do so. His favorite occupation is agriculture, which, if successful in the summer, ensures him an indolent existence for several months. Slavery has long been abolished by law; but the lower classes readily incur debt which practically binds them to service, as they are liable to be prevented from working otherwise than as their creditors may determine. The employer-creditor is in a position during the slack season of agriculture to furnish working gangs to any undertaking that makes it worth his while to do so. These gangs return to their fields in summer, and may not become again available until near the end of the year, though some of them offer service after the sowing season.

Sulphurets.

An Unappreciative Sketch of an Unappreciated Metallurgist.

It was not his proper name, but they all called him Sulphurets because of certain wonderful results which he claimed to have obtained in experimental operations on "rebellious" silver ores, said experiments having been made by the aid of a frying-pan, to which he had adapted some kind of a muller or stirrer. He had "advanced ideas" on many subjects besides metallurgy. His external costume consisted of a cork helmet, a pair of brogans, a ditto of overalls, and a garment of his own design and manufacture which was a cross between a sack coat and a heavy overshirt. He used neither tobacco, whisky, profane language, nor, to any great extent, soap.

I had not been long in conversation with him when something struck his crank and set him going, or, rather, set his tongue going, which was less desirable. He was that most discomforting of beings, an unappreciated genius; at least he was unappreciated, very much so. His voice was characterized by that peculiar style of melody combined with vigor which marks that of a macaw disporting himself, head downwards, on a perch.

Pointing a dirty forefinger at me, he screeched, "You an' me's pardners! You an' me's pardners!" I was the one his soul had yearned for; I was his affinity; my mind was the oasis in the desert of ignorance and prejudice in which his ardent soul had wandered. I was the only one he had met who was capable of appreciating the great truths he had discovered. His delight was unbounded and irrepressible; mine was of a milder character. I had one partner already, but that circumstance did not disconcert him; we were to be inseparable from that moment—he and I. My old partner and I had claimed a stream of water which we were preparing to utilize, and my new "pardner" and I were to put up a water-wheel which a touch of his genius was to evolve from the simple germ of an old wagon-wheel. We would put up a wheel and work silver ore from Cerro Gordo; we would teach the world how to work silver ore. Had not my new friend worked silver ore in a frying-pan, and was genius like his to be wasted for want of a little money so long as I had some? No! We would go in together; he would furnish the brains, I the money, and together we would once more revolutionize metallurgy and make our fortunes.

Sulphurets was a believer in evolution, and one day he worked himself into a state of unusual enthusiasm. Perhaps it was the consideration of the great things we were going to do which naturally led up to the plans of the Almighty; perhaps he, like some of our parsons, had private information on the latter. With fervid eloquence my new "pardner" unfolded to my feeble intelligence the stupendous vista of an impending mighty development of humanity, till, screaming with excitement, the dirty finger again upraised, he announced the glorious climax in these immortal words: "I'll just tell you what it is, my good friend; God A'mighty's a-goin' to make a blamed fine man one of these days, an' that man's a-goin' to be a Yankee!" In about a week he disappeared; where he went none knew, as none knew whence he came.

Some years later I was at Benton, in Mono county, and one day my quondam friend Sulphurets rode into town on a sort of chariot, which he had improvised from the front wheels and shafts of an old wagon. He was perched above the back of his apology for a horse, on a seat constructed on the ends of two spring-poles attached to the carriage, leaving the space between the wheels for his belongings, not a bad arrangement, by any means. He was still unappreciated and his voice was somewhat subdued, but not so his mighty spirit. He had given the metallurgical revolution a rest, and was intent on a new scheme.

This time it was steam which had to give way before the power of genius. He would drive machinery by the power of explosives, gunpowder, nitroglycerin or anything that would "bust." His fundamental proposition was that the result of an explosion was a vacuum, and, as nearly as I could gather, his plan was to propel his piston in one direction by an explosive, while the return stroke was to be effected by atmospheric pressure.

I suggested chloride of nitrogen as a well-known though little used explosive of established reputation for punctuality and dispatch. I was convinced that his engine would go if he should once get it started. I also believed it would create a vacuum at the spot where he would be at the critical moment, so I encouraged him all I could. But there was a hitch. The encouragement he wanted was the kind that bears the stamp of the U. S. Mint, and of that I had none to spare in exchange for a vacuum.

Finally, though he did not explode and create a vacuum, he went off and left a vacancy which suited me as well. I saw him ride away on his unique and ingenious chariot, and have had the pleasure of never meeting him again.

C. H. A.

Scientific Progress.

The Action of the Eye.

It can be taken as a fact, which the theory nf the action of the eye implies, that for each external impresslon, that is, for each image produced on the retina, the ends of the visual nerves concerned in the conveyance of the impression to the mind must be under a peculiar stress or ln a vibratory state, said Nikola Tesla in a paper read before the Franklin Institute. It now does not seem improbable that, when by the power of thought an image is evoked, a distant reflex action, no matter how weak, is exerted upon certain ends of the visual nerves, and, therefore, upon the retina. Will it ever be within human power to analyze the condltion of the retina when disturbed by thought or reflex action, by the help of some optical or other means of snch sensitiveness that a clear idea of its state might be gained at any time? If this were possible, then the problem of readlng one's thoughts with precision, like the characters of an open book, might be much easier to solve than many problems belonging to the domain of posltive physlcal science, in the solution of which many, if not the majority, of scientific men implicitly believe. Helmholtz has shown that the fundi of the eyes are themselves luminous, and he was able to *see*, in total darkness, the movement of his arm by the light of his own eyes. This is one of the most remarkable experiments recorded in the history of sclence, and probably only a few men could satisfactorily repeat it, for it ls very likely that the luminosity of the eyes is associated with uncommon activity of the brain and great imaginative power. It ls fluorescence of the brain action, as it were.

Another fact having a bearing on thls subject which has probably been noted by many, since it is stated in popular expresslons, but whlch I cannot recollect to have fnund chronicled as a positive result of observation, is that at times, when a sudden idea or image presents itself to the lntellect, there is a distlnct and sometimes painful sensation of luminosity produced in the eye, observable even in broad daylight.

Two facts about the eye must forcibly impress the mind of the physlcist, notwithstandlng he may think or say that lt is an imperfect optical instrument, forgetting that the very conception of that which is perfect, or seems so to him, has been gained through this same instrument. First, the eye is, as far as our positlve knowledge goes, the only organ which is *directly* affected by that subtile medium which, as sclence teaches us, must fill all space; secondly, it is the most sensitive of our organs, incomparably more sensitive to external impressions than any other.

This divine organ of sight, this indispensable instrument for thought and all intellectual enjoyment, which lays open to us the marvels of this universe, through which we have acquired what knowledge we possess, and whlch prompts us to and controls all our physical and mental activity—by what ls it affected? By light! What is light?

It is beyond the scope of my lecture to dwell upon the subject of light in general, my object being merely to bring presently to your notice a certain class of light effects and a number of phenomena observed ln pursuing the study of these effects. But to be consistent in my remarks, it is necessary to state that, according to the idea now accepted by the majority of sclentific men as a positive resnlt of theoretlcal and experimental investigation, the various forms of manifestation of energy which were generally designated as "electric," or more preclsely "electro-magnetic," are energy manlfestatlons of the same nature as those of radiant heat and light. Therefore the phenomena of light and heat, and others besldes these, may be called electrical phenomena. Thus electrical science has become the mother science of all, and its study has become all-important. The day when we shall know exactly what "electricity" is, will chronicle an event probably greater and more important than any other recorded in the hlstory of the human race.

Dimensions of the Fixed Stars.

Prof. E. S. Holden, director of Lick Observatory, writes as follows to the *Morning Call* under date Oct. 13th: I desire to give some brief account of a very important dlscovery which has lately been made at the Lick Observatory by Professor Campbell. His paper containing the technical details has just been sent to the sclentific journals, and it is a proper time to glve a more popular account.

Our knowledge regarding the stars has long needed the addition of one fact. One questlon has hitherto remained unanswered; namely, wbat are the actual dimensions of the stars, or of any one star?

The distances of a number of stars are quite accnrately known, considering the difficulties of the determination. The masses of a few stars are known, and these masses are not very different from the sun's mass. They are at least of the same general order of magnitude. The chemical constitution of many of the stars is well known from spectroscopic observation. The motlons of many stars in the line of sight—joining the earth and the star—are also well known from slmilar observations, and their motions in directions at right angles to the line of sight are known from observatlons made with meridlan instruments.

When we consider the enormous distances of stars in general and the comparatlvely small amount of light of each star, it must be admitted that much has already been learned regardlng them. One datum is still lacking. What are their actual dlmenslons? or what is the actual diameter of any one star? This question has been hitherto unanswered, and it is a capital one. As the stars in general are of the same order of mass as the sun, it is to be presumed that they are also of the same order of size. But it is a question needlng solution.

A very ingenious method for doing this has been invented, and it will probably be tried at Mount Hamllton. It is so dellcate, however, and beset with so many practical difficultles that while the principle of the method is entirely correct, success in lts practical applicatlon is very doubtful.

The question has, however, been solved by Professor Campbell for one star in an unexpected way ln the course of his spectroscoplc observations. The principle employed by him has previously been applied with reference to the sun in the same manner. The solar atmosphere contains many different substances so highly heated as to give out light. These substances are arranged in the sun's atmosphere in the order of their densities, the heavier ones lower and the lighter ones hlgher. The length of the spectral lines of each substance tells the height to whlch it extends. This observation is not very difficult in the solar spectrum, but it was entirely unexpected when Professor Campbell found a star (D. M. 30 deg., 3639) with a bright line spectrum surrounded by an atmosphere of hydrogen gas of such enormous extent as to be measurable.

This hydrogen sphere surroundlng the solid nucleus of the star is five seconds of arc in angular diameter. When the distance of the star ls known (and observatlons to this end are in progress) this angular dlameter can be expressed in miles. Then for the first time we shall know *the actual dimensions of one of the fixed stars*. This discovery of Professor Campbell's ls absolutely unique, and it opens an entirely new field of knowledge. It is so important that it should be known at once.

Skin-Grafting at San Diego.

A wholesale operation at skin-grafting has just taken place at San Diegn. About three months ago Mrs. W. Cole was terribly burned about the face, arm and body by the explosion of a gas stove. The left arm lost all its cutaneous covering, the burn extending into the muscular tissues so that from the shoulder to the wrist it was but a mass of raw flesh. The right arm was burned only from the elbow to the wrlst. Another burn covered a surface of over a square foot on her right side from the hlp upward.

The skin refused to grow on the mass of raw flesh, and Drs. H. E. Crepin and P. C. Remondino, who were called in, decided that grafting was necessary.

On October 18th, 40 persons assembled at St. Joseph's Hospital for the purpose of offerlng a cutaneous contribution to the suffering woman. Mrs. Cole was taken to an operating room, where, being placed on the table, the left arm—the only one operated upon that day—was exposed and treated with an antiseptic solution of boracic acid and soda.

The visitors came in one at a time with their arms prepared by an assistant, and Dr. T. L. Magee deftly removed the grafts from their arms. These were from the slze of a grain of wheat to the size of a silver dime, taken only skin deep, the instruments used being an oculist's tissue forceps and a pair of ocullst's curved scissors. The grafts were dropped into a bowl of warm water containing a little of boracic acid and soda borate. The number of grafts taken varied with the endurance and physique of the giver. It mlght also be added with the amount of their Christian zeal and fervor. Several became faint, and the Sisters of Mercy were kept busy administering stimulants to the weak. One, a man, fainted outright and had to be put to bed.

The arm was finally covered from shoulder to wrist, and it was then dressed in molst carbolized gauze. Over these layers came several layers of indoform gauze, then several layers of absorbent cotton prepared in boric acid, then more layers of lodoform gauze, and finally a roller bandage.

Two days later the other arm was likewise treated, the lodge of Elks generously contributlng a number of their members to the needed sacrifice. Among these were Engene Daney, a Past Exalted Ruler of the order, and several of the lay members of the order. James Connell, one of the Elks, and Mr. Fish, also of the same lodge, contributed liberally of the skin over their biceps muscles. Several other gentlemen of the order had previously left their quota of epidermis with Dr. Remondino, who took it to the hospital in a small jar.

Mrs. Cole is resting easy, and her physicians have strong hopes of her speedy recovery. It will take the grafts about a week to become firmly rooted, after which, by a process of pollferation, they will branch out and coalesce so as to cover the entire arm.

The other method of skln-grafting, by planing off a large surface of thln skin from the body, usually the thigh of the patient, was not adopted in thls case, as such a procedure requlres an anesthetic and Mrs. Cole's condition would not admit of its administration. By this method sufficient skin could have been taken from two or three persons—layers several inches square and as thin as a postage stamp—to have covered both arms and sides.

This is the second case of skin-grafting that has been performed at the hospital within a year, another case—an elderly gentleman who had suffered a great loss of skin over the right breast from the ravages of a carbuncle—was successfully treated by skin grafts. One of the physiclans who operated upon the two latter cases says that snch plastic operatlons are naturally very successful in the mild San Diego climate.

Mechanical Progress.

Natnral Gas.

The rapid decrease in the output of gas wells in the different sectlons of the country shows, despite the fact that wells are being drilled, that the natural-gas supply is not lastlng nor equal to the demands. The Indiana gas fields, that were for a time so productive as to lead to the bellef that the regions about the gas-producing belt of that State would soon be a bee-hive of industry through the lntroduction of numerous factories, are rapidly playing out. In other parts of the country the output is decreaslng to a similar extent, and at the present time gas for other than heating and lighting purposes is difficult to obtain.

The era of natural gas has shown the desirability of gas as a fuel to such an extent that it is wlth reluctance that any one who has used this fuel will return to the use of coal, and this leads the *Stationary Engineer* to believe that mannfactured gas having a high heat value will be produced by companies and dlstributed for heat and power purposes to an extent approaching that of the natural product ln favored localities. The amount of gas suitable for heating and steam-making purposes whlch can be obtained from coal generally exceeds the amount suitable for illuminatlng purposes, and for that reason it is altogether probable that producer gas, as it may be styled, will soon be supplled in large quantities. With works establlshed for this pnrpose, there is little question as to the demand for the product, providing it could be supplled at a reasonable price, for with an eqnal heating value to that of coal, when price ls compared, the gas would be preferred on account of its cleanliness and the convenience found in its use.

Treating Stones for Construction.

Architects have lately called attention to the desirability, in the case of stones to be used for lmportant purposes, that it be quarried, stored and seasoned for some time before being hewn and placed ln the walls, the natural sap being by this means allowed to evaporate and the stone tested as to its quality; it is admitted that this method would add to the cost, but the money would be well spent, if this precaution prevented the washing of such stones, by rains, frost or atmospheric influences, whlch, especially in cities, soon act on the surface of a newly quarried stone, says the *Builder and Woodworker*. On the other hand, stone is quarried one day and built the next in a green state, and must be considered unfit for use; that ls, not in condltion—lt is at its weakest—its pores are open and ready to absorb not only moisture bnt the gaseous and disfiguring lnfluences which tend to its destruction. It is well known to every hewer that to get a polished surface on a stone that has lain for some time is very different from what is obtained on one fresh from the quarry—a fact which of itself ls regarded as sufficient evidence to warrant the course recommended, namely, to thoroughly season the stone before using.

A Sand Suction Dredge of 4000 Tons per Hour Capacity.

A snction sand dredge with a capacity of 4000 tons per hour has been built by the Naval Construction and Armaments Co., of Barrow-in-Furness, England, for work on the Mersey bar, near Liverpool, says the *Engineering News*. The sand-pumping machinery consists of two centrifugal pumps with 36-inch suction and delivery pipes. These pumps are on each side of a well and draw from a T-head at the top of the suction pipe, and around this head as a trunnion the tnbe can be raised or lowered to snit the depth of the water, and a ball and socket joint gives a certain amount of lateral mo-

tion. The suction nozzle is turned over at the bottom with its aperture almost at right angles to the axis of the tube.

The hull of the dredge is 320 feet long by 46 feet 10 inches wide, with a depth of 20 feet 6 inches, and the loaded draft is 16 feet 4 inches. She has twin-screw engines and a speed of 10 knots loaded. The sand is pumped into hoppers, and on a recent trial on the Mersey these hoppers were filled at the rate of 100 tons per minute.

To Raise the San Pedro.

Moran Brothers, foundrymen of Seattle, are about to undertake the wrecking of the steamer San Pedro, lying on Brotchie ledge, Victoria harbor. They will proceed on the same lines adopted without success by Captain Lachlan for the owners, the Southern Pacific Company. Moran Brothers will, however, bring into service, in addition to the powerful machinery utilized by Captain Lachlan, twelve large centrifugal pumps, which have been specially manufactured for the occasion. Each of these has a capacity of over twenty tons of water a minute, a continuous stream of about the diameter of a good-sized barrel, and, provided the holes in the hull are stopped, can empty the San Pedro of water in less than a quarter of an hour. The first detail of the work is repairing the injuries received by the coffer dam during the recent gale. Then active operations will commence.

Fast Passenger Whaleback.

The whaleback passenger steamship Christopher Columbus, says *Seaboard*, has created consternation in the circles of the passenger trade all over the lakes because of the records she has made between Chicago and Milwaukee for speed. She has been making twenty miles an hour easily, and this with but 2600-horse power in a vessel 361 feet long, 45 feet beam and 24 feet depth of hold. The secret is that she is of a type that sets aside the notions that have dominated in ship construction since it began and, instead of building a great freeboard with a corresponding waste of material and weight in order to "overcome" or "combat" the seas and the wind, she presents to both a surface that is specifically designed to minimize the effect of the wind and to offer no resistance to the seas above the water line.

Consolidating Steel Ingots.

At the Nykroppa Iron Works, in Sweden, steel ingots are consolidated by pressure arising from centrifugal action. In the center of the casting pit is an upright shaft carrying four arms, to each of which is jointed an ingot mold. The molds are filled, and then the shaft is set in motion. As the speed increases the molds gradually move from the vertical to the horizontal position, and a pressure is developed in the fluid metal equal to 30 times that due to the head in the first instance. This drives out the gases and produces solid castings. The circumference of the circle described by the molds is 67 feet, and the velocity is nearly 10,000 feet per minute. The inventor of the process is Mr. L. Sebenius.

Utilizing a Waterfall.

It is proposed to distribute power from a fall on the River Aar at Wynau, Switzerland. There is some 2000-horse power available, and it is intended to use two media in its distribution, namely, compressed air for distances up to three miles, and electricity up to twelve miles. The high-tension current will be transmitted by naked copper conductors, carried on special insulators, at a pressure of 8000 volts. In the turbine-house at Wynau will be five compressors capable of furnishing 2500 cubic metres of air per hour at eight atmospheres pressures.

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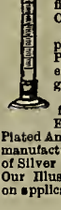
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Useful Information.

Germany's Zinc Product.

Germany produces more zinc than any other country in the world; the exportation of zinc is accordingly very heavy, amounting to 28,000 tons, against an importation of not quite 9000 tons, says *Kuhlows*. The main zinc-production district is in Upper Silesia, where the metal is made from calamine, and also more and more from zinc blende, by distillation. The smelting of zinc blende has led here, as in other places, to the establishment of very perfect arrangements for utilizing and preventing the deleterious effects of the sulphurous acid generated in the roasting of the ore. In Germany, in 1890, 139,000 tons of zinc were smelted, in which work 9271 men were employed. The value of the output was 62,000,000 marks ($15,500,000 approx.), of which 64 per cent was produced in Upper Silesia, 20 per cent in the Arnsburg district, and the remainder in the Government districts of Dusseldorf and Aachen (Aix-la-Chapelle) and the kingdom of Saxony. The ore in the western parts of the country is in the main zinc blende. The smelting of zinc is made very difficult, in most localities, by the presence of other metals in the ore. However, by a careful preparation of the ores and purification of the zinc obtained, this difficulty has been overcome. By the use of regenerative gas heating furnaces and well-adapted condensers the cost of production has been reduced and loss of metal prevented. With the smelting of zinc a small production of cadmium is connected.

Abuse of the Stomach.

Different constitutions have peculiarities in regard to the way in which they assimilate food, and the old adage that what is one man's meat is another's poison, is a very true one, says the *Popular Science Monthly*. There is no ailment more common in middle life and in old age than indigestion. This, of course, depends upon improper food taken too frequently and in undue quantity. As a rule, the victim of indigestion flies to medicines for relief, or to one of the thousand-and-one quack remedies that are advertised to cure everything.

How much more rational would it be to alter the diet, and to give the stomach the food for which it is craving? If the stomach could talk, I can imagine it, after pills, and gin, and bitters, and quack remedies of every description have been poured into it, begging to be relieved of such horrors, and saying, "Give me a little rest, and a cup of beef tea and a biscuit, and go and take a little fresh air and exercise yourself." Instead of this, the miserable organ has to be dosed with all sorts of horrible concoctions in the way of drugs, brandies and sodas, and champagne, to endeavor to stimulate it into action. There is no doubt that the stomach that requires stimulants and potions to enable it to act efficiently, can hardly be said to be in a healthy state, or can long continue to do its work properly.

The digestive organs, unfortunately, are the first to sympathize with any mental worry. They are like a barometer, and indicate the errors of malnutrition and its consequences. The healthy action of every organ depends upon the proper assimilation of the food taken. As soon as the digestive process fails, everything fails, and ill-health results with all its disastrous concomitants.

Remedy for Toadstool Poisoning.

Captain McIlvane's recommendation when, by mischance, any of the poisonous toadstools have been eaten, published by him in the *Therapeutic Gazette*, is as follows: "The physician called upon to treat a case of toadstool poisoning need not wait to query after the variety eaten; he need not wish to see a sample. His first endeavor should be to ascertain the exact time elapsed between the eating of the toadstool and the first feeling of discomfort. If this time is within four or five hours, one of the minor poisons is at work, and rapid relief will be given by the administration of an emetic, followed by one or two moderate doses of sweet oil and whisky in equal parts. Vinegar is effective as a substitute for oil. If from 8 to 12 hours have elapsed, the physician may rest assured that amanitine is present and should administer one sixteenth of a grain of atropine at once."

The atropine should be subcutaneously injected, and the injection repeated every half hour until one-twentieth of a grain has been given or the patient's life has been saved.

Healthy Bed Clothing.

In hospital, as well as in private practice, great errors are made in the matter of bed clothing for the sick, and particularly for the sick who are suffering from febrile affections. We have got rid of the heavy curtains around the bed; of the grand accumulator of dust and other uncleanliness, the tester; of the heavy valiance which converted the underpart of the bed into a close cuphoard, in which all kinds of unwholesome and cumbrous articles lay concealed, including sometimes excreted matter itself; and we have banished the carpet, which, often a hard-trodden, dust-laden rag, made the floor beneath the bed persistently impure, says *Hall's Journal of Health*. But the old feather beds, flock mattresses, heavy blankets, thick, impermeable and dense counterpanes still encumber many a patient, rendering ventilation of his body as impossible as in the days of our forefathers. The thick, dense bed and mattress require to be replaced by the light steel elastic bed, and the clothing under and upon the patient, now so close and heavy, requires to be replaced by clothing that is porous, so that it can be permeated with pure air from without, and can at the same time permit the warm and impure air from the patient to have free exit. The mistake now so generally made lies in the idea that the warmth which the bed calls for is best obtained by close material and close packing. The error is positive. There is nothing that retains warmth in so good and equable a manner as common air at rest. Dense materials cannot keep the body respirably warm. Materials, therefore, both for the bed and for the bed clothing, ought to be porous to a free mechanical extent of porosity. The rule holds good for the clothing of the body in health; in sickness it is imperative.

Rest in Motion.

"If I am harried or wearied by care or work," said a man who works with his brains, "I can always find rest in motion. I just stop work and get out and walk. As I walk, the weight is lifted, and finally it is gone altogether, and in place of that tired feeling comes tranquility succeeded by elation. It was a pleasing discovery to make, that I could walk out of depression into buoyancy. At first when the exercise was new to me, I needed to go but a little distance to accomplish this happy result, and so clearly defined was the change that I could locate almost exactly the spot where my burdens disappeared and I found myself in the pleasant company of my hopeful, kindly friend, Cheerfulness. I still seek Cheerfulness by that road and I find him unfailingly; but I have to go farther and farther to meet him, for, like any other stimulant, the walk must be taken in constantly increasing doses in order to produce the same results. At first a brisk walk of a quarter of a mile brought me to the boundary line; now I find it about a mile and a quarter away. It may be that I will have to seek Cheerfulness nearer home as a permanent atmosphere, for it is obvious that if I must go greater and greater distances to meet the personified Cheerfulness, he might one day be practically beyond reach."

The Annual Ring in Trees.

The average rings in trees exist as such in all timber grown in the temperate zone, says the *Builders' Gazette*. Their structure is so different in different groups of timber that, from their appearance alone, the quality of the timber may be judged to some extent. For this purpose the absolute width of the rings in regularity in width from year to year, and the proportion of spring wood to the autumn wood must be taken into account. Spring wood is characterized by less substantial elements, the vessels of the thin-walled cells being in greater abundance, while autumn wood is formed of cells with thicker walls, which appear darker in color. In conifers and deciduous trees the annual rings are very distinct, while in trees like the birch, linden and maple the distinction is not so marked because the vessels are more evenly distributed. Sometimes the gradual change in appearance of the annual ring from spring to autumn wood, which is due to the difference in its component elements, is interrupted in such a manner that a more or less pronounced layer of autumn wood can apparently be recognized, which again gradually changes to spring or summer wood, and gradually finishes with the regular autumn wood. This irregularity may occur even more than once in the same ring, and this has led to the notion that the annual rings are not a true indication of age; but the double or counterfeit rings can be distinguished by a practical eye with the aid of a magnifying glass. These irregularities are due to some interruptions of the functions of the tree, caused by defoliation, extreme climatic conditions or sudden changes of temperature. The breadth of the ring depends on the length of the period of vegetation; also when the soil is deep and rich, and light has much influence on the tree, the rings will be broader. The amount of light and the consequent development of foliage, is perhaps the most powerful factor in wood formations, and it is upon the proper use of this that the forester depends for his means of regulating the development and quantity of his crop.

Why Better Western Than Eastern Records?

A correspondent writes to the New York *Commercial Bulletin* asking why better western than eastern records are made by the European steamships crossing the Atlantic? The interrogation editor says in reply that the gain or loss of time between noon and noon in going east or west has no effect upon the comparative time of passages across the Atlantic. Allowance is made for this in announcing the time of passage. That the westward record is the better arises mainly from the following facts: (1.) The Welsh bituminous coal, which steamers burn going west, gives better results than the American bituminous coal used upon the return trip. (2.) The usual western track is from 20 to 30 miles shorter than the eastern. The quickest westward passage was made over a track of 2782 miles, and the best eastward passage over one of 2811 miles—a difference of 29 miles in favor of the western record. (3.) Vessels coming in this direction are assisted by the Southwest current.

New Safety Matches.

Safety matches that can be used without a box are to be placed on the English market by a German inventor. The idea is to tip the two ends of the wood separately with those compositions which in the ordinary way go one on the box and the other on the match. To use, break the wood across the middle and rub the ends together.

Electricity.

Is Electricity to Replace Steam?

In a pamphlet recently compiled by a British civil engineer, Mr. F. B. Behr, it is argued that existing railways are unequal to sustained speeds of 120 or 150 miles an hour, because (1) their curves are too sharp (2), the lateral strain from centrifugal force with such velocities is too great for an outer rail unless it be elevated to an undesirable degree, and (3) the drivers of steam locomotives are inadequate to the rapid rotations required. The present maximum with safety he assumes to be 50 or 60 miles an hour, and this he believes cannot be exceeded without constructing new lines, and after new designs. He therefore recommends the separation of lightning express traffic from the slower passenger and heavy freight service, the elimination of way stations requiring frequent slowing down and starting up, flatter curves and the use of electric motors attached to each car in the train (as in the Intramural road in Chicago) rather than one locomotive to haul them all, thus dispensing with much needless weight, yet securing superior efficiency. His most radical proposition, however, is to operate such electric cars upon a one-rail road.

This structure will be about five or six feet high, with a triangular cross-section, and lengthwise it would be a continuous girder or cantilever. A heavier rail than is now in use (say 120 pounds to the yard) would surmount the trestle, and on each side, down about three feet from the crest, there would be guide rails. Upon this "permanent way" the cars would ride, saddle-fashion, the sustaining wheels being mounted in the crotch of each one, and the lower edges on either side would carry bearing wheels on their inner surfaces, touching the guide rails. The bottom of a car therefore would be only two or three feet above the ground. The engineering details have all been worked out quite carefully, the cost of constructing has been estimated, and even the luxurious fittings of the coaches have been considered. Mr. Behr also proposes to reduce atmospheric resistance by providing wedge-shaped fronts to his vehicles, and there are some original features to his method of connecting dynamos to axles.

The New York *Tribune* tells of a single rail system, such as Mr. Behr would adopt for fast service but with various modifications, which has been in operation for several years in Ireland, on a line 9½ miles long, between Listowel and Ballybunion, and is called the Lartigue system, presumably after the inventor. And another road of exactly the same character has recently been constructed from Feurs to Panissieres, in the Department of the Loire, France, and it was to be opened for business last month. Neither line was built with a view to extraordinary speed, but both are equipped with electric cars, each with its own motor, and run in trains, not singly.

Electricity in Gardening.

By the use of electric light the Hon. W. W. Rawson of Arlington, Mass., claims he makes a gain of five days in each of his three crops of lettuce—that is, two weeks in a season; that the gain on one crop pays all the expense of the electric lighting for the season, thus giving him the gain on the other two for extra profit. His attention was first called to the usefulness of the light by the advance made in the growth at the ends of the greenhouse next the street and in the glare of the electric light. This was so marked that he introduced the light through his lettuce and cucumber houses. Dr. Bailey of Cornell University says, as the results of his own experiments, that the influence of the light is greatly modified by the interposition of a glass roof. Plants injured by a naked light were benefited by the pro-

tected light. Five hours light per night at a distance of 12 feet hastened maturity a week or ten days, hut proved injurious to new plants and those newly transplanted.

Agricultural Electricity.

An interesting example of electricity as applied to farm work is now in operation at a Scotch farm, says the *Scientific American*. The whole of the nsnal farm machinery, such as thrashing, sowing, corn thrashing and the like, is here driven by an electric motor. The electricity is generated hy water-power, the tnrbine wheel which drives the dynamo heing abont 1000 yards from the farm. The electric current is conveyed hy nndergrond wires to the honse and farm, in each of which a storage battery is placed. These supply the electric cnrrent for lighting and motive purposes when the machinery is not working. The whole of the mansion is illuminated by electric light, and an electric motor is provided for pnmping the water for domestic purposes.

Inexpensive Electric Clock.

Herr Von Hefner-Alleneck, of Berlin, has devised a clock which is claimed to solve the problem of providing an inexpensive yet effective system of electric control of clocks. It is placed in circuit like an ordinary incandescent lamp. The current keeps the clock wound at an annual cost oot exceeding that of one 16 candle lamp bnrning for ten hours —perhaps eight or ten cents. Shonld the circuit be broken, the clock will run without cnrrent ahout 12 hours. The regulation can he performed hy hand from the dynamo-room or automatically from an observatory, and consists of a momentary lowering of the circnit potential by six to ten volts at 5 A. M., the effect being to set all the clocks in the circuit at 5. The lamps are not appreciably affected.

Electric Ambulance.

An electric ambnlance is the latest development in St. Lonis. It will be as swift and steadier than a vehicle drawn by horses, and will be given right of way by the street-car companies. In some cities the electric street railways want to undertake the carriage of the city scavenging, and there seems no reason why they should not do the work well. In Ottawa the street railway has offered to carry the mails between the depots and the postoffice. It looks as if the time was coming, says the *Electrical Review*, when a citizen wonld have to take an electric ride out into the country to see a horse.

Against Paraffin.

The accidents caused by high-tension electric currents have lately heen discussed by the electrotechnicians of St. Petersburg, and we understand they have passed a unanimous resolution against the use of paraffin in the construction of accnmulators, and resolved that when putting an accumulator together a way of escape shall always be left for gasses.—Invention.

To Record Changes of Temperature.

Changes of temperatnre are now recorded hy an electrical apparatus produced by a Frenchman. It is a metal ampulla half full of ether hermetically sealed, and when the temperature rises the ether expands and slightly raises the cover, which completes an electric circuit, rings a bell, and warns those who want to know that the temperature is going np.

From Nothing to Near a Billion.

A writer gives an illustration of the progress of electricity as a mechanical power. He says that 25 years ago it was unknown, and that $900,000,000 is now invested in various kinds of electrical machinery.

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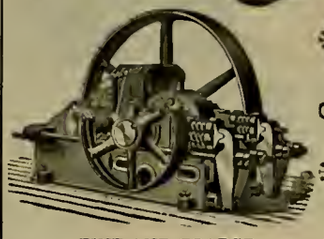

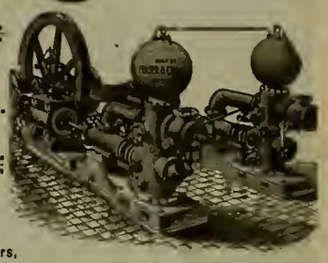

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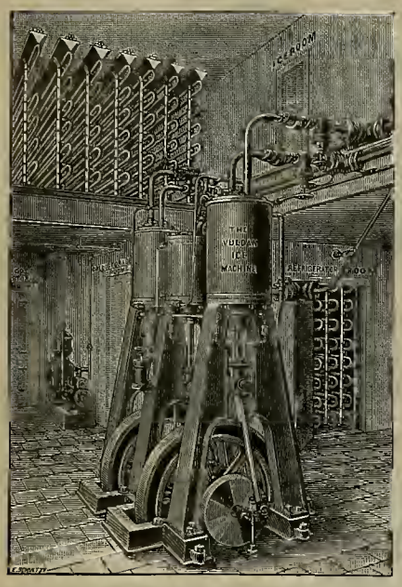

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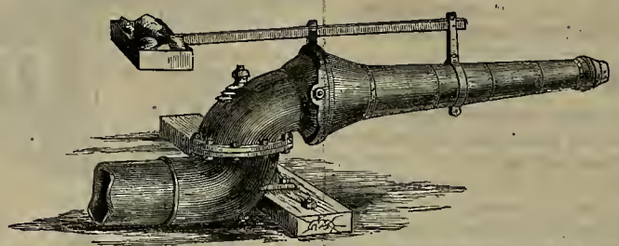

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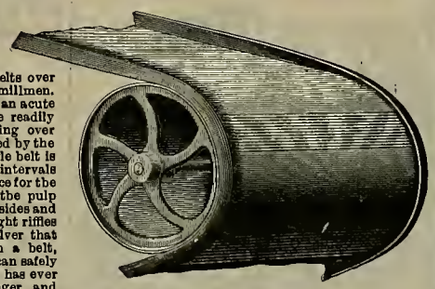

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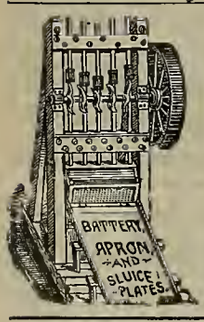

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A Letter to Miners.

The Fair Committee of the State Miners' Association has gone systematically to work in the preparation of the proposed mining exhibit at the Midwinter Fair. It has just issued a circular letter, which is as follows:

No complete and full representation of the mining industry has ever been made at any public exhibition or fair on this coast. The varied agricultural and horticultural features of the State have, however, been so fully and frequently brought to public notice in this way that they have, in a measure, overshadowed those of the mines, and many have come to believe that the mining industry of California is of small proportions. In fact, it is largely owing to these circumstances that in public estimation, for instance, either the wine, raisin or orange crop of each year is supposed to be of more value than the mineral products of the State. The fact is, however, that all three combined do not nearly reach a value of $13,000,000 annually, as our gold product alone does. Nor is the mineral industry of California confined to gold alone, but includes silver, lead, quicksilver, borax, chrome, antimony, manganese, lime, marble, building stone, petroleum, asphaltum, bituminous rock, clays, coal, salt, alum, asbestos, bismuth, tin, cement, plumbago, gypsum, iron, infusorial earth, kaolin, metallic paint, mica, nickel, ochre, rock soap, slate, sulphur, talc and other substances. It is not out of place to state, in this connection, that in the mass of "immigration literature" issued in this State few, if any, of these substances are even mentioned as products of California, yet in several instances they are produced nowhere else in the United States.

The value of the total mineral products of California is about $20,000,000 per annum. The record of California for gold alone is one to be proud of, for it leads all the geographical divisions of the world and eclipses everything in history. Over $1,250,000,000 in gold has this State given to the world in 43 years; nearly $1,300,000,000 added to the world's wealth by this one State of the Union. It is not a past record alone on which this industry bases deserved recognition, for though California has always, since the discovery, far distanced annually all the other States in gold yield, it to-day turns out over $7,000,000 a year more than any other State, notwithstanding the decreased yield owing to the mistaken policy of closing down the hydraulic mines, which produced about $10,000,000 more. California alone produces to-day over one-third of the annual gold output of the United States.

The gold product of the State may be still further increased by the investment of capital in undeveloped properties. One of the main objects of the proposed display at the coming Midwinter Fair is to bring prominently before the public the importance of the mining interests, that the attention of capital may be attracted here. But, as stated, it is not on gold alone that the mines of California depend. Work in none of the departments of the mineral industry has ceased; it is still being carried on in all and with success. But only those directly interested understand or realize the importance of the different branches.

An adequate and proper display, which shall represent all these varied branches of the mining industry, will be of incalculable advantage. Probable investors, not only in our own communities, but from outside our borders, must be shown what we have to become interested. It rests with the mining men of this State to see their industry represented before the people in a suitable manner. The California mining display at Chicago was by no means equal to those of other less important mining sections of the country, but the judgment of the public is based upon what they see, and the miners of this State cannot afford to let this opportunity pass—the first one they have had on this coast—without making an earnest effort for a grand display, which shall show to the world how important and varied is the mining industry of California.

The Midwinter Fair management has granted free for this purpose 10,000 square feet of space in which to make the proper representation of the mining industry. If special mining or mineral exhibits by separate counties, individuals or corporations are made elsewhere, the necessary space must be obtained from and will be charged for by the Midwinter Fair Commission, which fact should be understood by the county committees. In the space already set aside for the general State mining exhibit, allotments will be made to the counties without charge and they will be allowed to make their own installations, if so preferred. These must be, however, under the supervision of the executive committee, so that there shall be a harmonious whole when completed. The space being limited the exhibits must be compactly arranged, and upon one general plan, for which reason the miners' executive committee reserves the right of supervision. They will be prepared to give receipts for all articles sent to the exhibition. Safes will be provided for valuable specimens, police protection given, watchmen will be employed by night and day, and every possible care taken of articles on exhibition, but the committee can assume no financial responsibility in this connection.

Counties making separate installations must provide their own cases for specimens, etc., but if articles are sent directly to the committee show-cases will be provided. It is expected that each county, at its own expense and for its own benefit, will provide a competent representative, who shall not only have care of its exhibit, but be able to describe the mineral resources of the section.

The exhibits of ore, quartz or other minerals for the mining department will be transported both ways free of charge by the Southern Pacific Company, it being understood that the same are for exhibition only, having no commercial value or, if valuable, not being intended for sale. It is understood that if any lots of ore are turned over to the smelter, or otherwise disposed of commercially, the company shall be guaranteed regular freight rates on the same.

The County Commissioners are urged to make as much haste as possible in their collection of exhibits and promptly inform the executive committee of the space required. The executive committee reserves the right to so arrange the space at command as to allot it in proportion to the importance of the display.

Coast Industrial Notes.

—Shingle certificates circulate as currency at Blaine, Wash., stores.

—An effort is being made to organize a union of sealers at Victoria, B. C.

—The Prescott & Arizona Central railroad has withdrawn its trains. The road is 72 miles long, but since the building of the Santa Fe, Prescott & Phœnix road the latter has had all the business.

—Subscriptions amounting to $2000 have been received for improving the Big Tree road at Santa Cruz, which will be one of the points of attraction for Eastern and foreign visitors during the Midwinter Fair.

—The San Francisco and San Mateo railway has commenced to run cars through from the ferries at Market street to Baden, or new South San Francisco. Half-hourly trips are made and a tariff of 15 cents charged for the fourteen-mile ride to the meat city.

—The North Pacific Coast railway has passed into the hands of James B. Stetson, A. Borel, Mr. Coleman of Grass Valley, C. de Guigne and the Scottish-American Investment Company. J. B. Stetson is now president, A. Borel vice-president and the directors are the new owners mentioned above.

—A receiver has been appointed for the Pullman Mercantile Company at Pullman, Wash., of which L. M. Ringer, a respected citizen of 20 years' residence, is president. The assets are $200,000 and the liabilities $135,000. H. G. Depledge, cashier of the First National Bank of Pullman, is the receiver.

—A disastrous fire occurred at Gold Beach, Or., October 18th, by which R. D. Hume's salmon cannery, hatchery, merchandise store and several other buildings were destroyed. The fire started in the lacquer room of the cannery and it is said that evidence points strongly to incendiary work. The loss will reach $75,000.

—The new board of directors of the Northern Pacific has organized by electing Drayton Ives president, Robert Harris vice-president, C. H. Scott of Tacoma second vice-president, George S. Baxter treasurer, George H. Earl secretary. S. W. Petrit was appointed general attorney and J. A. Barker general auditor.

—The steamer Mariposa, which sailed last week for Honolulu, carried from Captain Whitelaw's wrecking establishment an anchor weighing 10,280 pounds, a large steam pump and eleven purchase blocks, to be used in attempting to get the stranded steamship Miowera off the coral reef near the entrance to Honolulu harbor.

—The changing current of the Santiam in Oregon is threatening to render useless the Sanderson bridge. It has already cost about $30,000, and the Linn county, Or., officials are debating whether it will be cheaper to keep following up the changing channel or tear the bridge down and rebuild it at some point where it is more permanent.

—The creditors of the Geyser Water Company have petitioned the Supreme Court to have the company declared insolvent. The petitioners and the amounts due them are as follows: Dickman, Jones & Co., $11,272; Holbrook, Merrill & Stetson, $624; Abrahamson & Bacon, $555; Solomon & Co., $260; M. H. de Young, $3228.

The directors of the Washington Aluminum Manufacturing Company at Ellensburg, Wash., have elected J. M. Hirsh of Chicago president and voted to set aside 20,000 shares to begin with as a working capital. Work will begin on the preparatory features of the plant as soon as possible. The aluminum will be extracted by Hirsh's electric process, and the dynamos and other machinery will be run by water power.

—The powder-house of the Kutner-Goldstein Company at Fresno was set on fire and blown up one night last week. Nearly all the homes near by were wrecked. On Mariposa street, nearly a mile and a half from the explosion, the sidewalk is covered with broken glass. The Hughes hotel suffered heavily. Twenty-seven windows are broken. This building is a mile and a half from the powder-house.

—The mercantile agency of R. G. Dunn & Co. reports that Wright, Browne & Co., ship chandlers and commission merchants at 34 and 36 Steuart street, have placed their business property in the hands of a trustee for the benefit of their creditors to meet liabilities aggregating $130,000. The firm is one of the oldest in its line on this coast and until three weeks ago was considered "solid as a rock."

—The Southern Pacific shops are to be run on full time. The change has gone into effect and applies to all points on the system between Portland and El Paso. During the time of the greatest stringency the working days in the company shops were reduced to four a week. In returning to the old schedule the men will work six days a week of eight hours each. This order will affect about 5000 men, and will increase the pay-roll about $100,000 a month, or $1,200,000 a year.

—The winter-time schedule of the coast division, Southern Pacific railroad, has gone into effect, and the Sunday excursion trains to Palo Alto and Monterey have been discontinued. Another noteworthy change in the movement of trains is the leaving time of the early San Jose train, which leaves the Third and Townsend-street depot at 6:45 A. M. instead of 7. This change is chiefly for the benefit of pupils attending school at Palo Alto. The midday train for the cemetery and Palo Alto will leave at 12:25 P. M. instead of 12:05 P. M.

—The Dickens-Hobart Lumber Company of San Francisco decided at a meeting of its stockholders, held October 4th, to transfer to J. B. Dowling, in trust for the benefit of creditors, all of its assets. The cause alleged for the course is inability to meet current debts. Mr. Dowling will assume management of the corporation's affairs and will conduct its business in accordance with the wishes of a majority of the creditors. The inventory of assets and liabilities filed in the Hall of Records shows that the concern has debts aggregating $21,651, and assets amounting to $29,794.63.

—The League of Progress has been investigating the telephone rates of San Francisco, and it announces that they are higher than elsewhere. The cost here is from $150 to $300 annually, and the rates in other cities average about one-third of this sum. Some of the rates are as follows: Memphis, $48 and $60, residence and business rates respectively; Detroit, $50 and $72; Louisville, $60 and $72; Chicago, $100 and $125; Baltimore, $78 each; St. Paul, $60, and from $72 to $96; Minneapolis, $60 and $72; and in Buffalo, a flat rate of from $50 to $130, according to the number of calls.

—The special committee of the Oakland City Council on water supply has prepared a basis upon which estimates will be received from companies desiring to bid for a city water system. Every bidder must agree to deliver water at a graduated price per 1000 gallons, under a pressure of 50 pounds per square inch, and in a minimum quantity of 2,300,000 gallons and a maximum quantity of 10,000,000 gallons. The successful bidder must agree to give the city an option to purchase the plant within ten years at a price not to exceed 10 per cent in excess of the cost, with interest at 6 per cent per annum until purchased.

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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

NEW STAMP MILL.—*Ledger*, Oct. 20: The five-stamp mill recently purchased by the Farrell Mining Company at Middle Bar, is rapidly being placed in position.

The Argonant Company, whose property is located south of the famous Kennedy, broke ground Wednesday, for its three-compartment shaft.

The tunnels now being driven through the Albany grounds are cutting stringers of quartz giving low assays.

The property which for some time has been prospected by Farrell, Wise & Seligman at Middle Bar has been incorporated under the name of Farrell Mining Company.

J. B. Francis returned from a trip to San Francisco Wednesday night, and brought back with him coin to pay off the employes of the Alma. Work is progressing on that property as rapidly as number for the various buildings arrives, two men being engaged in framing timbers. The hoist and engine are on the road from San Francisco, and will be put in position as soon as they arrive. The shaft is now down about 70 feet, as far as it is profitable to go until the new hoist is in position.

Butte.

ONE MORE QUARTZ MILL.—Marysville *Democrat*: G. W. Price of Forbestown has let a contract for the erection of a new ten-stamp mill on a quartz ledge owned by him and known as the Colorado. The ledge is within a short distance of Forbestown, and development work has shown it to be extensive and rich, the ore running high in free gold. Mr. Price is to have his mill running inside of 60 days. To supply water to this and other mines in that vicinity the Forbestown Ditch Company is now engaged in reconstructing an old line ditch running to the north and west of Forbestown. The expenses of this repair will be about $1000, and water can be supplied to several mines now being developed. When this mill is completed there will be 90 stamps in operation in the Forbestown district, not including those of the "R. C." mine, near Brownsville."

LIVELY TIMES.—*Bulletin*, Oct. 24: Butte county is experiencing a revival of mining. Major A. F. Jones of Oroville, who was in this city yesterday, says there is more activity in mining in Butte than the county has seen at any time for ten years past. This activity is in the direction of quartz and drift mining. So far as the Major knows, there is no movement to reopen any of the gravel mines by the hydraulic process under the Caminetti act, but a number of the old hydraulic mines are likely to be worked by drifting. Among these is the great mine at Cherokee, which has been closed four years. At Bangor and others points in the mountains or hills there is a good deal of mining in progress. There is some prospect of the reopening of the famous Perschbacker gravel mine at Magalia, which, the Major says, is probably the richest gold mine in the world. It is owned by N. D. Rideout.

Mono.

BEAUTIFUL ONYX.—San Francisco *Examiner*. California is always turning up some new resource, and now Mono county comes forward with an onyx discovery and a beautiful exhibit for the Midwinter Fair.

The travertine and onyx discoveries near Bridgeport, Mono county, are attracting much deserved attention, and promise to materialize into a great industry. It is strange that such an inexhaustible, valuable, scarce and most beautiful material for ornamental and building purposes should have so long escaped the eagle eyes of the modern prospector and scientific men who have so often visited this section. Scientific men have pronounced it a "wonderful formation," but none seemed to know that the immense backbone protruding above the Hot Springs basin, Mono county, is a mass of travertine and onyx, of which the former is the only known heavy deposit in this country, all of that material used in the United States being imported from Italy, Rome being built mostly of travertine. The pavement of the vestibule of the Mills Building in this city is Italian travertine. Bridgeport is opening the quarry in Antelope valley and will make a grand and valuable display at the Midwinter Fair, and Monoites will not be ashamed of it. This week a block of travertine was quarried seven by four and a half feet and two feet thick, and weighing about five tons. It will be dressed and polished and shipped to the Fair, where it will attract great attention. There will be also an exhibit of fine blocks of onyx, comprising black, white and variegated, all of which make a beautiful and attractive display.

Nevada.

ST. JOHN MINE.—*Union*, Oct. 21: Some good-looking quartz specimens from the St. John mine were brought into town yesterday afternoon by Superintendent Wheeler. The rock was taken from a crosscut in the 300-foot level, where there is a good-sized ledge. A ledge 12 feet in width, showing well in mineral, has also been encountered in the bottom level of the St. John.

THE CENTENNIAL.—Virginia City *Chronicle*: Secretary James of the Centennial on Monday received a letter from Superintendent Richards stating that he has started another side drift, 1800 feet in from the mouth of the main tunnel. At this point the gravel is much less cemented than in the first side drift, and shows coarser gold. The drift is in about 20 feet and making

good progress, the ground working very favorably. The San Jose mine, adjoining on the south, has a fine deposit of the same gravel, which is paying well. The Centennial tunnel is 2600 feet long. This mine is above Nevada City, California, on the Washington road.

LOOKING WELL.—*Transcript*: The "93" is the name of a gravel mine in the upper part of the county that is owned by Nevada City and Grass Valley parties. Frank and Will Worthington, of this city, are interested in the mine and have been working there for several weeks past. Good prospects have been met with and it is believed that a channel of rich gravel will be found. The mine is located near the line of Towle Bros.' railroad.

THE ORLEANS.—*Union*: Superintendent Geo. L. Thurston of the Orleans mine informs our reporter that the shaft is now down 100 feet and it is proposed to continue sinking until a depth of 250 feet is attained. The hoisting-works building has been completed, and shortly the hoisting and pumping works will be put in place under the efficient management of Joseph Bennallack.

THE GREEN MOUNTAIN MINE.—*Telegraph*: In the Green Mountain mine Superintendent Dan Coflin tells us that there is a ledge in the 300-foot level that surpasses anything he has yet seen underground in that property, and from indications presenting themselves, Mr. Coflin expects in a very few days to strike something far beyond the ordinary. The level at the 300 will soon be started and then drifting to the north and south will he commenced. While the drifting is going on the miners will still continue sinking the shaft.

RICH SHOOT.—*Herald*: It is rumored that a rich shoot has been struck in the Spanish mine, this district. The Nevada City, too, is shipping to the smelter some of the richest ore ever mined at Woods Ravine. The managers do not care to say how rich it is, bot the fignres are high. A new hoisting works is being built at this mine, and the machinery from the lower works will be moved into it, and various surface improvements made.

Plumas.

THE SHENANDOAH.—*National-Bulletin*, Oct. 19: The Shenandoah Mining Company has been erecting several small huildings at the mine in French Ravine—boarding house, blacksmith shop, cabins, etc., and laying in snpplies preparatory to winter. The mill has heen running steadily since it started a few weeks ago, with what results we do not know, bnt inasmuch as the company continnes making improvements, we presume the output of gold is satisfactory. It has been closed down for the winter, however, and from Mr. King, who came out yesterday, we learn that Capt. Smith and he will start to Oakland on Friday, where the Captain has important bnsiness demanding his attention. Fonr men will remain at the mine and continue the extraction of ore dnring the winter. The mine is looking better than for some months past.

NO CHINASA.—*National-Bulletin*: Mr. White, superintendent of the Qoincy Mining and Water Company, informs us that it was the policy of the company to employ no Chinese on the mining enterprise inaugurated by them. At the present time a large force of white labor—men—is employed in all the work connected with the property, including those erecting the sawmill for C. R. Thompson. This means an expenditnre for labor, in round numbers, of $200 per day.

San Diego.

REOPENED.—San Diego *Union*: The stock of the Escondido Gold Mining Company has recently passed into the hands of Los Angeles parties, and, throngh the efforts of W. W. Thomas, who also has an interest, the new owners have heen indnced to commence work on the property. Last Monday evening a party of five miners arrived in Escondido, proceeded to the old Mexican mines southeast of town, and commenced the work of cleaning out one of the shafts. The party is in charge of G. W. Fredericks, who is snperintending the work. It is stated that the new company has purchased 75 per cent of the stock in the company which controlled the mines, and that it has plenty of money to prosecute the work. The new owners state that after an investigation as to the work formerly done in the mines they were satisfied that it would repay all the expenses of operation and leave a good profit for the stockholders, and it was after arriving at these conclnsions that they decided to commence work. At present there is no machinery on the ground, but as soon as the work progresses far enough to require pumps and hoisting machinery they will be forthcoming. The men with Mr. Frederick are all practical miners, and all are of the opinion from indications of the old works that it had paid good money when operated, and have no donht as to the result of the work they have in hand paying after they get the mines opened up.

Tuolumne.

RICH STRIKE.—*Independent*. A wonderfully rich chnte of gold-hearing quartz was struck a few days ago in the old Rawhide mine near Sonora, Tnolumne county. Experts in quartz mining who have examined the vein and the rock taken out estimate that the ore will run very high.

The rich find was made on the 400-foot level of the mine, on what is known in that section as the east vein of the famous mother lode. The chnte opened to a width of eight feet and last week the rich ore had been followed to the depth of 14 feet with prospects of growing richer and wider. The discovery created considerable excitement in and ahont Sonora and many men visited the mine to inspect the ore for themselves. It was apparent to all old miners that the vein wonld yield more gold than any other mine in recent history of the county, and if the prospects are realized the old Rawhide mine will be the greatest gold producer the world hss ever known.

The directors of the Tuolumne Connty Fair association realized the importancs of the great striks and a messenger was hurried to the mine to secure a large sample for exhibition in the pavilion. A piece of quartz ahout three feet long, fourteen inches wide and five or six inches in thickness wss carried to the pavilion and displayed for the amazement of visitors. The rock was literally sprinkled with the precious metal, showing a character that is full of promise to the lucky owners of the mine. The exhibit was carefully guarded and proved to be the most attractive thing in the large pavilion. The day after the fair the big specimen was carried back to the mine and placed on a large dump pile of the precious ore.

An experienced miner who visited the mine last Monday says the lucky owners have in sight fully $150,000 in the rich rock uncovered. It is believed that the vein will increase in richness as the drift is extended and that the find will soon surprise the world of mining men and attract renewed attention to prospecting along the great mother lode. All the rich discoveries along this great quartz formation have been on what is called the east vein. The main body of the mother lode does not carry gold, but there are chutes on either side which yield enormous returns. The new Rawhide vein has all the characteristics of a steady prodncer and being an east vein it is believed to be permanent.

The Rawhide mine was opened in 1860 hy a wealthy eastern company and a valnable mill was huilt to work the ore. The yield of gold was heavy for a long time and the mine was recognized as a very rich one. Finally the vein was worked ont and the mine was closed. A few years later the mill was destroyed. The mine remained closed for npward of 20 years nntil W. A. Nevills of San Francisco reopened it a conple of years ago. He found good milling ore and made a deal with Ballard & Martin of that city to erect a mill. They recently finished a 40-stamp mill on the mine at an expense of $65,000 and thus became the owners of two-thirds of the mine. The mill will be started up this month, when wonderful reports may be expected from the old Rawhide.

Nevills, Ballard & Martin are also working the old App mine at Qoartz mountain near Jamestown. They recently made a very rich strike in that mine, which will warrant the building of a new mill on that old property. These two discoveries have given a new impetus to the qnartz mining industry in Tuolumne county.

NEVADA.

Washoe District.

SUMMARY OF COMSTOCK OPERATIONS.—The only place in the Consolidated California and Virginia mine from which ore was extracted last week was in the south drift from the winze, 52 feet below the 1650-foot level. From this point 18 tons of ore, assaying $28.08 per ton, were taken ont. Most of the work in other parts of the mine is on repairs. The gallows frame (inclnding foundation) at the Con. Virginia shaft has been thoroughly repaired. The expense of this work has been paid in full, amounting to a little over $900. Everything is now in readiness to proceed with the work of making necessary repairs to the shaft between the surface and the 1000 level.

The recently started prospecting work on the 1465 level of the Ophir and Mexican mines continnes, but no important changes in formation have yet occurred. On the 900-foot level of the Union shaft the joint Sierra Nevada and Union north drift from the west drift, 1520 feet west of the shaft, has been advanced 10 feet; total length, 224 feet; face in clay and quartz giving low assays. Wednesday we struck a strong flow of water, since which time have been engaged in cutting a drain and repairing the drift. In the Best & Belcher and Gould & Curry mines the usnal prospecting work is being done, without any changes of importance.

In the Hale & Norcross mine, on the 1300-foot level, they have sunk the winze 5 feet during the week, continning in ore. Total depth of winze, 33 feet. Have extracted 10 cars of ore, assaying, per car sample, $26.40, and 10 cars of ore assaying $15.78 per car sample. In the Chollar mine the north drift, 145 feet north of south line, 100-foot level, is out 138 feet; face is in quartz and porphyry. Eighteen feet back from the face of this drift we have started a crosscnt west, which is now out 20 feet; face in porphyry. They are yet engaged in making repairs to the main incline below the 930 level. In the Potosi mine the north drift is 63 feet below the 1000 level, which is ont 70 feet; face shows 3 feet of fair-grade ore. Extracted and sent to the mill the past week 187 tons 500 pounds of ore from the 1150 level. Milled during the week, 187 tons. On hand at mill, 100 tons and 1200 pounds. Average battery assays, $17.33; average car sample assays, $18.68. At the Ward shaft the west drift from the station, 820 level, is out 250 feet from the shaft; face in porphyry. In the Occidental Con. mine they have extracted from the stopes above the 400 level about 10 tons of ore of the average value, as per car samples, of $38 per ton. The west crosscnt from No. 2 npraise, started at a point 75 feet below the 300 level, is in 71 feet; face in porphyry, with seams of quartz.

Silver City District.

RUNNING FULL BLAST.—Dayton *Times*: The Mt. Bnllion mine, owned hy F. S. Lacronts, is rnnning full blast, and good ore is coming out lively.

Butch Geyer has struck it pretty rich in his mine. He says the "yellow stnff" shows np so thick in all parts of the ledge that he has to get above ground occasionally to keep from going blind.

Lockerman and Collier had a rich clean-up from the ore they sent to the Dazet mill. Some of the ore is said to have been worth $1000 per ton. They are having trouhle over the division, however, and will settle their differences before Justice Walker.

White Horse District.

NEW MILL.—*State Journal*, Oct. 21: The Whits Horse mines near Wadsworth are coming to the front. W. H. A. Pike says Walter Schmidt of White Plains has completed arrangements to bnild a small mill at the mines. He has the machinery, and will commence hauling it to the mines immediately. He says there is ore enongh to run a ten-stamp mill, bot money is scarce and he cannot afford to build snch a mill at present. Mr. Schmidt has had considerable experience in mining. He owned the Rye Patch mines in Hnmboldt county in early days. He is a practical assayer, and fully nnderstands working gold as well as silver ores.

ARIZONA.

DOING WELL.—Prescott *Courier:* John S. Jones' mill, Chaparral gulch, finished, about two weeks ago, a run on Little Jessie ore, on which its stamps have heen dropping since April last. Rich ore continues to be taken from the Little Jessie by F. L. Wright, lessee. The main shaft is now down 165 feet. Quite a force of miners are at work on the claim. Mr. Jones has finished a shaft honse and will place hoisting machinery in it as it arrives, and proceed to sink a deep working shaft. This mine has produced many thousands of dollars the past year, and as development work progresses holds out as well in richness and size as at first. The ledge is strong and well defined. The ore plates on an average about $50 per ton, and concentrates abont 100 ponnds the ton; concentrates rnn $200 per ton.

GOLD FAVORED.—*Journal-Miner*, Oct. 18: D. P. Nichols, the well-known miner and farmer of Skull valley, says that either the hard times or the low price of silver has made his section a favored one with gold-hunters, there being at present over 40 men in the foothills east of the valley engaged in placer mining with dry washers. These old-time fields have produced thousands of dollars in placer gold, and being easy of access and as the pay dirt lies but a few inches from the surface, less labor and expense is met with than is usual in this character of mining. He says in two days he cleaned up an ounce of fine gold, while from the other camps in the district miners are making from $3 to $7 per day.

A PRACTICAL MAN.—Prescott *Courier*: A four or five days' sojonrn among the mines of Big Bng convinces your correspondent of the trnth of what has so often been claimed, namely, that when pnt under the management of practical men many of the mines in this locality, now considered too low grade, will he added to the dividend list. As an example of what a man of experience can do, Mr. J. R. Ritchie, who has for months heen running on the low-grade ore of the Old Bullion, may be cited. Paying a 10 per cent royalty for the lease of the mine, hanling the ore two miles over a steep mountain road to a five-stamp mill, for which he must pay $50 per month rent, paying his help the top wages, this generous, nnassuming, thoroughly practical man has succeeded in extracting a good margin of profit from an ore that would for others before him not pay expenses of mining and milling.

MOHAVE NOTES.—Kingman *Miner:* The White Hills Company will soon erect a five-stamp silver mill on the G. A. R. mine.

A number of men are working on the mines in Minnesota and Weaver districts, and some of them are taking out nice little stakes.

This part of Arizona will receive a great deal of attention dnring the year 1894 in the matter of irrigation schemes and the working of mines with electric plants.

More mills are necessary for the working of ores in Mohave county.

There are 16 leasers working on the Norma mine, at White Hills, nearly all of whom are doing well. G. C. Blaine has the best showing, and has taken out more rich ore than any other man in White Hills.

A new csmp has been opened up 35 miles west of El Dorado Canyon, and the mines are heing worked by several companies. A claim was sold there for $8000 one day last week, and several more sales are on the tapis.

There is a project on foot to start np the Todd Basin mill. This mill, in good hands, could he made to pay a hig profit to the owners. There is plenty of good ore in the vicinity of the mill that can he worked profitably, hut is considered too low grade to ship to the smelters.

All damage done hy the hig flood at El Dorado Canyon has been repaired, and now the mill of the Southwestern Mining Company is ponnding away on good ore. The Canyon has been one of the hest producing camps on the Pacific Coast, and will undoubtedly he prodncing hullion when more recent camps have passed in their checks.

A number of Pennsylvania companies are looking over the country with a view to investing in some of our gold mines.

The rock work on the Nevada Southern railroad, near Vanderbilt, is being pushed as fast as possible, hut it will be some months before Dry Lake valley is reached.

Work on the Nighthawk mine is developing as rich a body of ore as has ever before been uncovered in that property. Gaddis & Co. are the lucky lessees of this mine.

Jackson, Mix Bros. and Cleve are delving in the Old Grey Eagle, in Wallapai mountain, and are extracting some rich silver ore. They have a fine prospect and will soon commence shipments to the sampler with the regularity of clockwork.

The ten-stamp mill recently erected in Yellow Pine district, to work the Keystone ores, has been ponnding away for some weeke. Returns from the first bars of bullion were recsived hy the Needles National Bank Thursday from the Denver mint. The bnllion was nearly 1000 fine.

The Keystone is said to be a valuable property and is owned by I. E. Blake and W. S. Godbie.

An average of 91 sample assays made at the Kingman sampler gave an average of over $500 per ton in gold and silver. The greater number of the samples were the basis of settlements of ore purchases.

By Collins and Ton Stinson are working the stopes of the Blackfoot mine, sitnated between Todd Basin and Stockton Hill, and are getting splendid copper ore. This ore carries from $100 to $1000 in gold per ton. They have a nice block of ground to cnt out and will get many carloads of ore before they strike grass roots. They have let out some of their surface ground and the lessees are getting good ore.

OREGON.

MINE SOLD.—Ashland *Tidings*, Oct. 20: The Ophir mine near Ashland, owned by McCarthy, Beswick, Martin, Roper and others, has been sold to a Mr. Lawrence, cousin of the mayor of Brooklyn, N. Y., for $1500, cash sale, money to be paid in 30 days. The Ophir has two prospect tnnnels in it, and some fine prospects have been strnck. It is near the Golden Fleece, upon which the Huntington mill is to be put up immediately, and is supposed to be a similar formation. Mr. Lawrence started for New York last week, and is expected back soon.

Another quartz mill will begin its musical hum in this neighborhood soon. Dr. W. H. Flanagan of Grant's Pass has taken an interest with Hill & Shannon in the Golden Fleece mine, north of town, and is moving his Hontington mill to the mine, which has been operated on Williams creek, in Josephine county. The Golden Fleece is a claim on E. K. Anderson's land, crossing the upper end of the old McCall & Anderson gravel mines, which have been worked by hydraulic pressnre for many years. Mr. Hill, who is an experienced miner, became convinced that this placer mine was fed by a mineralized dyke or ledge near at hand, and in his prospecting fonnd the sonrce of the gold to be an extensive body of ore which had been cnt into at the upper end of the gravel mine. He and R. T. Shannon secured a hond or long-time lease of the gronnd from E. K. Anderson, and have been actively at work prospecting it doring the past few months. Different parties have examined the nroperty with a view to putting a mill upon it; but, as the formation is pecnliar and unlike what most of them have been familiar with, they hesitated until Hill & Shannon grew tired of waiting and began negotiations with Dr. Flanagan. Some 30 sacks of the ore were carted over to Williams creek and tested in the Flanagan mill, and the result was so satisfactory that it was determined to move the mill to the mine at once. It is being transported now by wagons, and will be put at work jnst as soon as the necessary bnildings and accessories can be constrncted. Mr. Hill not half a dozen men at work last Monday, fixing the wagon-roads and bridges across the gulches. The power is to be supplied hy a 20-foot overshot wheel (20-horse power) which I. O. Miller is now making. The mill—a Hnntington rotary—works np about 1½ tons of the ore per hour, and sconrs the gold so that much of it which would be lost in the hydraulic operations by failure to amalgamate will be saved on the plates. The battery is also supplemented with a first-class concentrator, and very little gold will get through to the tailings. Mr. Hill calls the ore deposit a boil between walls. The walls are a long distance apart, bnt he helieves it is a genuine fissure and that the mine will be a deep one. However that may he, there is a vast body of ore on the surface. It can he worked for about $1 a ton, and, if it yields as the prospects indicate, the miners will have a bonanza.

W. L. McClnre and W. T. Shaffer were in town last Monday from Gold Hill, and a few mining items of interest were obtained from them. Joe Cox, who was with Lucky Bart in the discovery of the mine sold to Lindley, has made another rich discovery on Sardine or Murphy creek which he thinks will be a good thing. Lindley's mill is running steadily at the Lncky Bart mine, and everything is reported favorable there. At the Hammersly mine, at the head of Jump-off-Joe, the mill is disahled, but the mine is opening out handsomely—ledge getting bigger as they go down, and as rich as ever.

S. D. Taylor came over a few days ago from his mine at the head of Hongry creek, and reports everything looking hright at the mine. Staples & Van Vactor's new five-stamp mill, not far from his mine, runs like clock-work and gives encouragement to prospecting in that region.

H. C. Dollarhide and Harvey Roach continue work at their coal mine in the Siskiyous, and with constant enconragement at the improvement of the prospect as their work progresses. They have found a good lignite coal, and believe that a tunnel which they are now rnnning will strike a vein of sufficient thickness to pay well for working. Their mine is within three miles of the railroad and within 300 yards of a wsgon-road.

COW CREEK MINES.—Jacksonville *Times*: C. S. Goodnow, of Cow creek, an old miner, started up his hydraulic works on the 20th of September. He thinks that he will clean np $5 worth of gold per hour when his works are in full operation. He has a hlne-gravel lead snch as is pecnliar to Califorvia, and snch leads are considered hy old miners to give the hest results from work performed.

Market Reports.

The Markets.

SAN FRANCISCO, Oct. 26, 1893.

The imminence of the repeal of the Sherman silver purchase law has had the effect of depressing the New York silver market, though the London market has remained practically unchanged during the week. The effect in this country, however, has been by no means what might have been anticipated, in view of the recent history of the market. When the Indian Government suspended purchases, the effect was instantaneous, and a drop of 20 cents per ounce occurred. The market subsequently partially recovered, but now, when it seems certain that this Government will likewise totally cease purchases, the result is a drop of less than one cent. The reason doubtless lies in a feeling of confidence, more or less well founded, that remedial legislation will follow repeal of the Sherman Act, and that the United States will soon again be a silver customer.

The really notable feature of the week has been the drop in lead. The New York quotation was yesterday 3.2 cents per pound, which is very nearest the lowest recorded—3 cents in 1879. The partial resumption of the silver-lead mines, the size of stocks on hand, and general business prostration, seem to be the leading causes.

Copper is dull and low.

Treasury Purchases of Silver.

A statement prepared at the Mint Bureau of the treasury shows that during the first quarter of the present fiscal year the Treasury Department, acting under authority of the Sherman Silver Act, purchased 8,923,108 fine ounces of silver at a cost of $6,479,003, and treasury notes to that amount were issued against the silver so purchased. In detail the purchases were:

Month—	Fine Ounces.	Cost.
July	2,218,982	$1,583,230
August	3,934,497	2,907,344
September	2,769,629	1,988,429

"If the full amount of 4,500,000 ounces had been purchased each month," says the *American Banker* of New York, "the silver purchase for the first quarter of the present fiscal year would have been 13,500,000 ounces which, at an average of 74 cents per ounce, would have made the treasury notes issued against the purchases foot up $9,990,000."

Silver Sales Light.

The total offerings of silver to the Government for the past half of the month were only 1,820,000 ounces. The total includes some lots that were offered two or more times. Silver was offered on six days during that period. On each occasion the proposals were declined, because above the London parity, and counter offers made for the whole quantity representing that parity. As the result of these counter offers, 666,000 ounces were secured at an average of 73½c per ounce. If the purchases for the last half of the month are not on a more liberal scale, the quantity secured will be under 1,500,000 ounces, against 4,500,000 authorized by law.

Silver and the Metals.

NEW YORK, Oct. 26.—Following are the closing prices for the week:

	Silver in— London.	N. Y.	Copper.	Lead.	Tin.
Thursday	33¾	73	9 50	3 30	20 80
Friday	33¾	72¾	9 50	3 35	20 80
Saturday	33¾	73⅛	9 50	....	20 80
Monday	33⅞	73¼	9 50	3 20	20 80
Tuesday	34	73⅜	9 50	3 20	20 80
Wednesday	33¾	72¼	9 50	3 37½	20 70

San Francisco Metal and Coal Market.

ANTIMONY.		QUICKSILVER.	
Per lb	— @ 13	Home trade, pr. flask	40 50 @41 00
BORAX.		STEEL.	
Refined, in car lots	— @ 7¾	English, lb	— @ 18
Powdered, do	— @ 7¾	Canton tool	— @ 8¼
Concentr'd, do	— @ 6¾	Sl'k Diam'd tool	8¼@ 15
All grades jobbing at advance.		Pick & Hammer	6¾@ 10
COPPER.		Machinery	4 @ 5
Bolt	23 @ —	Toe Calk	— @ 4¼
Sheathing	23 @ —	PIG TIN.	
Ingot, jobbing	— @ 20	Spot ₱ lb	21¾@ 22
Do, wholesale	15 @ 16	COAL.	
IRON.		SPOT FROM YARD—PER TON.	
Bar, base	— @ 2½	Wellington	$8 00
Norway, base	— @ 4½	Greta	7 50
PIG IRON.	Spot.	Nanaimo	6 50
Eglinton ₱ ton	— @—	Oilman	6 00
Glengarnock	27 00@—	Seattle	6 50
Am. Soft, No. 1	25 00@—	Coos Bay	5 50
Shotts No 1	27 00@—	Cannel	9 00
Puget Sound	— @—	Egg, hard	12 00
Clay Lane White	30 00@—	Wallsend	7 25
Langloan	27 00@—	Scotch Splint	8 00
Oartsherrie	27 00@—	Brymbo	7 50
Barrow	— @—	West Hartley	7 50
Cargoflect	— @—	TO LOAD—PER TON.	
LEAD.		Australian	6 50@—
Pig	— @ 4½	Liverpool Steam	6 87@—
Bar	— @ 5	Scotch Splint	7 00@—
Sheet	— @ 6	Cardiff	7 00@—
Pipe	— @ 5½	Lehigh Lump	10 00@—
SHOT.		Cumberland	8 50@—
Drop, sizes *smaller* than B, ₱ bag of 25 lbs	$1 75	Egg, hard	9 00@—
Do do, B and *larger* sizes ₱ bag of 25 lbs	2 00	West Hartley	7 50@—
Buck, Balls and Chilled do, ₱ bag of 25 lbs	2 00	COKE.	
		English, to load	$9 50@10 00
		Do, spot, in bulk	—@12 00
		Do, in sacks	—@14 00
		Cumberland	9 50@—

Mining Share Market.

SAN FRANCISCO, Oct. 26, 1893.

The Comstock market experienced something like a boom during the latter part of last week and Monday of the present. On the latter date the Board rooms and their approaches were crowded with interested people, and a total of fully 50,000 shares of all stocks changed hands at both exchanges during the forenoon. The leading stocks of the present speculation—Consolidated California and Virginia, Best & Belcher, Ophir, etc.—not only had a strong advance, but all the other Comstocks were higher. It really looked like old times on Pine street. After awhile the market receded a little under the liberal sales of traders who had profits in sight or who wished to sell short.

At the Pacific Board the crowd was so great it was hard to get in. The brokers had as much business as they could attend to, and the Comstocks opened with great activity and stronger prices. At the 9:30 A. M. session of the San Francisco Board the sales amounted to nearly 18,000 shares and were the largest of any session for over six months past. Ophir touched $1.60, Con. California & Virginia $3, Best & Belcher $1.50, and all the other stocks along the line moved up strongly in sympathy.

At the second session of the San Francisco Board the market continued very active. Prices had a small decline along the line. At the close $2.70 was bid for Con. California & Virginia and $2.75 asked.

On succeeding days there was strong pressure to sell and prices went back to about where they were a week ago.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, October 26, 1893.

9:30 A. M. SESSION.

300 Andes	25c	600 G & C	47c
500 Belcher	40c	400 Mexican	65c
700 B & B	1.15	500 Ophir	1.15
200	1.10	300 Potosi	55c
100 Challenge	20c	350 Savage	46c
100 Chollar	30c	150	45c
100	25c	100 Sierra Nevada	55c
1270 Con. Cal. & Va	2.35	100 Union	35c
50	2.40	350 Yellow Jacket	50c
900 Crown Point	25c	400	45c

2:30 P. M. SESSION.

50 Belcher	40c	100 G & C	45c
100 Best & Belcher	1.10	400 Mexican	65c
150	1.05	450 Ophir	1.15
100 Bullion	25c	50	1.10
100 Challenge	15c	200 Overman	15c
200 Chollar	30c	50 Potosi	55c
350 Con. Cal. & Va	2.35	100 Seg Belcher	15c
100 Crown Point	25c	200 Yellow Jacket	45c

Pacific Stock Exchange.

9 AND 10:15 A. M. SESSIONS.

100 Alta	7c	250 Confidence	72c
400 Belcher	40c	40 Mexican	72c
200	37c	250	70c
600 B & B	1.15	300	67c
250	1.17½	350	65c
700	1.12½	200 Occidental	10c
450	1.10	500 Overman	15c
300	1.07½	250 Ophir	1.20
300 Bullion	23c	300	1.15
350 Challenge	20c	800	1.12½
450 Crown Point	25c	700	1.10
900 Gould & Curry	47c	200 Potosi	55c
300	45c	300	52½c
200	45c	500 Savage	47c
170 C. C. & Va	2.50	300	41c
400	2.47½	450 S Nev	55c
150	2.45	400 Utah	12½c
350	2.40	200 Yellow Jacket	45c
400	2.37½	400	46c
500	2.35	350	43c
300	2.33½		

2 P. M. SESSION.

200 Bodie	18c	400	44c
500 Bullion	23c	250 Mexican	67½c
150 Chollar	30c	200 Ophir	1.15
350 C C & V	2 35	300 Seg Belcher	12c
300 G & C	43c		

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

INSULATING JOINT.—No. 506,034. Dated Oct. 3, 1893. Samuel W. Burtchaell of San Francisco, Cal. This joint is for connecting gas fixtures with house pipes in such manner that the proper insulation will be made for the attachment to the fixture of electric lighting apparatus. The improvement in the joint lies in its being non-rotatory, to which end the several parts interlock in a novel manner.

CAR COUPLING.—Joseph McDonogh. No. 506,528. Dated Oct. 10, 1893. This invention relates to safety appliances for coupling cars and it consists of a device by which the coupling link may be presented so as to enter the opening in the draw bar without danger to the operator. The coupling pin has a chain by which it is connected with an arm projecting from a horizontal shaft which is journaled upon the end of the car, and has a crank arm within easy reach from the outside, so that by turning the crank the pin may be let down, or withdrawn. Connected with this shaft are locking bars, by which it may be locked in any desired position to retain the pin in an elevated position, or to prevent its coming out when the cars are coupled.

CASH REGISTER AND INDICATOR.—Fred W. Vanghn, S. F., assignor of one-half to John D. Sibley of same place. No. 506,891. Dated Oct. 17, 1893. The object of this invention is to provide a cash register which, while exhibiting to the customer the amount of his purchase as in ordinary cases, also makes provision for the indication to the operator of a progressive amount or sum total, representing the entire amount of sales for any given time, the arrangement of the parts being such as to enable them to be manipulated easily and readily and at the same time preventing any tampering with the machine, by which its proper function and operation may possibly be perverted.

TRAVELING BALING PRESS.—John Wiebe, S. F. No. 506,892. Dated Oct. 17, 1893. The object of this device is to take up the hay as the machine is being drawn over the field and to deliver it to the baling portion of the implement, wherein it is pressed by the draft of the horses in moving the machine. It consists of a wheeled frame having means for taking up the hay, a baling chamber to which the hay is delivered, and means operated by the transference of the draft of the horses for actuating the follower of the baling chamber.

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MEETINGS.

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Alpha Cons M & M Co	Regular	Chas E Elliot, 309 Montgomery	Oct 31
Altoona Quicksilver M Co, Cal	Adjourned	Chas Allenberg, 630 Brannan	Nov 2
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Brophy M Co	Regular	337 Pine	Oct 31
Bulwer Con M Co	Special	L Osborn, 309 Montgomery	Nov 8
Great Western Q M Co, Cal	Special	L Osborn, 309 Montgomery	Nov 8
Osborn Hill O M & M Co, Cal	Special	R R Grayson, 331 Pine	Nov 3
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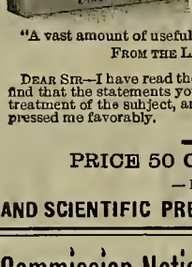

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DEAR SIR—I have read the MS. of your "A B C of Electricity," and find that the statements you have made therein are correct. Your treatment of the subject, and arrangement of the matter, have impressed me favorably. Yours truly,

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Cal. Debris Commission Notices.

NOTICE.—The California Debris Commission, having received petitions to mine by the hydraulic process from Westall and Hughes, in the New York mine in Sierra county, to deposit tailings behind a dam in Howard creek; from Corbiere and Bean, near Clipper Mills, Yuba county, to deposit tailings behind a dam in Hampshire creek; from W. A. and M. E. Schofield, in the Phoenix mine, near Hepsidam, Sierra county, to deposit tailings behind dams in Whisky creek and the North Fork of Slate creek; from the Craycroft Mining Company, in the Craycroft Hill mine, near Downieville, Sierra county, to deposit tailings behind dams in Davidson ravine; from the Excelsior Mining Company, in the Excelsior hydraulic mine, near Downieville, Sierra county, to deposit tailings in and near Eagle ravine; from the Eureka Mining Company, in the Eureka mining claim, near Downieville, Sierra county, to deposit tailings behind dams in Kanaka and Sawmill ravines, and from the Quincy Mining and Water Company, in the Bean Hill, Jack's Hill, Mountain House, Gopher Hill and Shore's Hill claims, near Spanish Ranch, Plumas county, to deposit tailings in old hydraulic pits and behind dams in Maurer ravine, Spanish creek and Green flat, gives notice to all concerned that a hearing will be held at the office of the Commission, Room 92, Flood Building, San Francisco, on November 7, 1893, at 1:30 o'clock P. M. On and before this hour and date all parties interested may file affidavits, plans and maps in support of their respective claims. By order of the Commission: W. H. Heuer, Major, Corps of Engineers, U. S. A., Secretary of the Commission.

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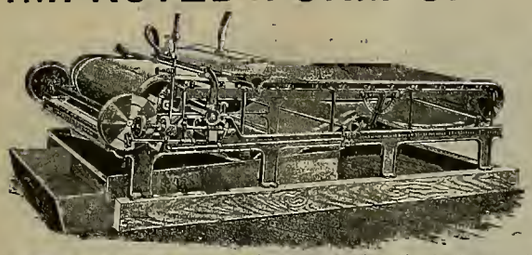

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(Signed) R. G. HART, Sr., Manager Texas and Cleveland Cons. Mining Co's.

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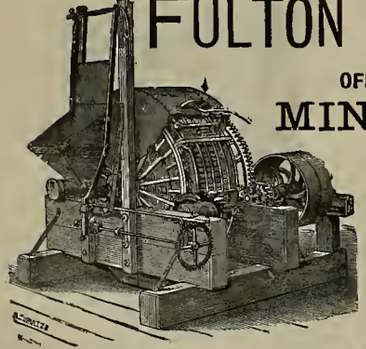

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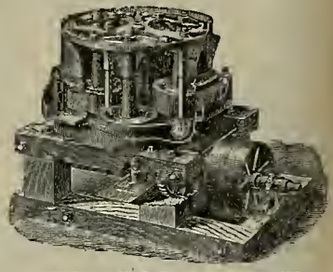

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VOLUME LXVII.
Number 19.

SAN FRANCISCO, SATURDAY, NOVEMBER 4, 1893.

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Portable Elevator Screen and Conveyor.

The accompanying illustration represents a practical and efficient machine for the handling of sand and gravel, manufactured by the Jeffrey Manufacturing Company, at Columbus, Ohio. The machine is designed to dig sand and gravel from the bank and then separate it and deposit it in separate cars. The capacity of this machine is about 40 cars per day of ten hours, making it possible to load 30 cars of sand to 10 of gravel, this depending largely upon the per cent of sand in the bank.

The machine is very substantially constructed, and can be built for larger or smaller capacities. The lower timber work is mounted on truck wheels to suit standard railroad gauge. On this truck is placed a circular gear rack engaging with a gear pinion which is fastened to an upright shaft on the upper frame work. Castor wheels and center plates are placed between the upper and lower frame work for the purpose of revolving the entire upper part of the machine on the lower frame work in a complete circular movement, thus enabling the operator to reach the bank from either side of track.

The elevator is constructed of Jeffrey special steel chain, being double strand, to which suitable buckets are attached. The buckets are made of heavy sheet steel handed on top edge, with teeth riveted to front lip for the purpose of digging the material from the bank. This elevator is mounted on a wrought iron angle ladder frame which is allowed to swing from the upper or delivery end of elevator by means of two wire cables fastened to lower end of ladder and passing over sheave wheels at end of jib timbers and down on to two spools on frame work.

By means of crank and gearing the elevator is raised up on to the bank and then is allowed to work its way down to a line even with the track.

The sand and gravel are elevated and discharged upon a shaking screen, the mesh of which can be made to suit the grade of sand desired, the gravel passing off over the screen on to a rubber belt conveyor into car, the sand passing through the screen to chute below and into the car. If it is desired at any time to work the elevator at an angle with the track, the shaking screen, chute and conveyor are arranged to swing at an angle, in order to keep them about square with the cars. Further particulars can be obtained of the makers.

PORTABLE ELEVATOR SCREEN AND CONVEYOR.

In this issue is contained an admirable review of the causes that have conspired to fill up the Sacramento and tributary streams, and of the obligations of the Government to erect restraining works at the outlets of unnavigable streams. The author is Hon. Tirey L. Ford, State Senator, framer of the Ford mining law and the State Debris Commission law, and chairman of the legislative committee of the State Miners' Association. Mr. Ford points out clearly that hydraulic mining has contributed only a small part of the detritus which has poured down from the mountains and filled up the rivers; and that construction of restraining dams is solely for the purpose of protecting navigable streams and therefore in strict accord with public policy. Any benefit to the farmer, to the miner, or to other private interests, is incidental. Mr. Ford's statement of the situation and of the Government's duty is complete and logical, and his argument is incontrovertible.

The falling price of lead has again affected the Cœur d'Alene mines, and it is questionable what will be the result, if there is no improvement in the early future. The Bunker Hill & Sullivan at Wardner, which started operations recently, has curtailed expenses in every possible manner, and for the present the night shift has been dispensed with. The statistical situation in lead gives promise of better prices, and it is to be hoped that an advance will soon occur.

What is seigniorage? is often asked. Seigniorage represents the difference between the actual cost of a metal and the making of it into money, including alloy, wastage, etc., and the nominal sum for which the coin thus made is paid out by the Government. For instance, if the Government makes a silver dollar at an expense of only 60 cents, the Government has made an apparent profit of 40 cents on each $1, this profit being seigniorage. There are fixed charges at the mint in making all coins. These include the cost of alloy and for refining and making the coin from the prepared metal. These fixed charges are added to the actual cost of the metal, and the difference between this sum and the nominal value at which the coin is passed by the Government represents the seigniorage or Government profit.

The Georgetown (El Dorado county) *Gazette* severely criticizes the figures recently compiled by Mr. Chas. G. Yale as to the California output of small and Chinese mines, and claims that "gross injustice has been done to El Dorado county as a gold producer." The *Gazette* complains that the output of the Taylor 40-stamp mill alone exceeds the amount given as the total gold product of the county, $198,321. The *Gazette* appears to misunderstand the situation. These statistics prepared by Mr. Yale represent only the product of small and Chinese mines, and exclude all large mines. They were taken from the records of the Government and not, therefore, from original sources. He is not responsible for the statement that the total El Dorado output is only $198,321. Other newspapers besides the *Gazette* have fallen into the same error and have given the Government estimate of $12,571,000 for the output of California in 1892 as Mr. Yale's. That gentleman became Government Statistician as late as August, 1893. The county totals used by him were first published in the volume of the director of the mint for "Production of Gold and Silver for 1892."

An effort has recently been made to secure the removal of the California Wire Works from this city to the East, representations being made to the owners that they would there be nearer a large and growing market, and therefore in better position to enlarge their business than in San Francisco. The removal of the plant would be a distinct loss to the manufacturing enterprises of this city. Employment is given at the works to 150 men, and, directly and indirectly, thousands of dollars are added to the business of the community by their operation. It is noteworthy that during the recent stagnation of business the works have been in full and active operation in the rope works, ropeway and wire mill departments. Large Eastern orders have required the concern to give employment to a full complement of workmen. It is therefore gratifying to know that removal is not contemplated by the wire-works people. They have secured much Eastern business by turning out a superior product, and they expect a continuance of such methods in the future as in the past.

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San Francisco, November 4, 1893.

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THE electrical display at the forthcoming Midwinter Fair is expected to show the development of that branch of invention in a very complete manner. It is stated that electrical concerns from both Europe and America have applied for space to exhibit their various appliances and the Western Electric Company has just been awarded the contract for furnishing light upon the proposed electric tower. It is this company that designed the Pompeiian electrical room at the Chicago Fair, the great electrical wheel with its 850 changes, the marvelous imitation of a stroke of lightning, and many other strangely beautiful sights. The electrical machinery will be placed in the Palace of Mechanical Arts. There will be electric motors and batteries, illustrations of lighting and heating by electricity, and exemplifications of electro-metallurgy and electro-chemistry. There will also be among the electric exhibits complete systems of intricate electric signals and of the application of electricity in every conceivable way. Phonographs will also have a place here, and one of the interesting features will be representations of the use of electricity in surgery and dentistry. Altogether visitors at the fair who have not been at Chicago may prepare to see everything in the electric line short of a Sing Sing electrocution.

A NEW ENGLISH AMALGAMATOR is being introduced in Colorado. As described, the machine employs a system of forcing the pulp through the quick. The apparatus consists mainly of a casing with inlet and outlet ways which lead into and from a lower and upper chamber, said chambers being separated from each other by a plate, but communicating with a central space common to both. At the bottom of the central space is the mercury stratum, space, or well. The entering of the pulp by ports leading under the mercury stratum to the central space and the reversed flow of the tailings through tangentially arranged curved wings and ports of a dividing wall in the upper chamber to the outlet way is easily understood by giving a little attention to the matter. Electricity is employed with the mercury in the treatment of refractory ores.

THE transactions of the Technical Society of the Pacific Coast for October contain a paper on "County Road Construction," by Julius H. Striedinger and Otto Von Geldern, read October 6, 1893, and prepared for the State Road Convention recently held at Sacramento. The notes are compiled from Nessenius, a leading European authority, with revision and additions adapted to road-building practice in California, such as suggest themselves to engineers of the ability and experience of the authors. A new chapter on dirt roads is introduced, under the belief that macadamized and gravel roads are best adapted in point of economy for our more important county roads, and that such improved and well-kept highways will be most commonly used for some time to come. It is a valuable publication.

The Assessment Work Bill.

Reports from Washington as to the status of the bill suspending the period of assessment work on unpatented mining claims are conflicting. There is, besides, much doubt as to the exact provisions of the bill, the text of which has not been received. The measure was presented by Representative Bell, of Colorado, and was first stated and understood to provide that the assessment year should end September 30th of each year, instead of December 31st as at present, and virtually that the year of 1893 should be extended to September 30, 1894. Late reports, however, say that the Bell bill really provides only for the suspension of the present statute for one year, and that the bill will probably pass with a proviso excepting South Dakota from its operations. This is in consequence of the hostility of Black Hills miners to the measure.

It is impossible to discuss the measure intelligently while its provisions are in doubt. The California miners are not united on the subject, though the late Miners' Convention placed itself on record as opposed to any change in this respect of section 2324 of the Revised Federal Statutes. That is to say, the miners declared themselves opposed to the Stewart bill, which proposed to make the assessment year begin October 1st instead of January 1st. No serious differences exist amongst the miners as to the inadvisability of the change; but there is more or less objection to the suspension of work for one year. It comes mostly from working miners, who are accustomed to perform labor on claims for non-resident owners and who will seriously miss any intermission of the annual $100.

The PRESS expects very soon to be in possession of the text of the Bell bill and its provisions will then be given in full.

LATER (Thursday).—The following press dispatch from Washington, under date of November 1st, explains the present status of the bill:

At 3 o'clock Chairman Weadock of the House Mining Committee called up the bill suspending for one year the performance of assessment work on unpatented mining claims, which has been in conference for several days.

The conferrees yesterday agreed on the bill, but excepted South Dakota from its operations in lieu of Senator Pettigrew's amendment which limited the benefits of the act to actual residents of the State or Territory in which a claim was situated.

Representative Pence, in a five-minute speech, explained the objects of the bill. He said that by the action of the Administration 10,000 miners in Colorado alone would be compelled to leave their mining claims and seek other means of earning a living for the coming winter, and that this measure, by relieving them of the necessity of performing their assessment work this year, would give them an opportunity to engage in other pursuits.

Representative Hartman of Montana also spoke in favor of the bill.

Representative Lucas of South Dakota briefly explained why South Dakota was excepted. He said that conditions in his State were different from those in other mining States. The suspension of assessment work would be of little benefit to miners, but would relieve a vast number of wealthy corporations from this obligation.

Ray of New York then took the floor and strongly opposed the clause in the bill excepting South Dakota. He considered it a great injustice to the owners of mining claims in New York, a good many of whom resided in his district. In spite of Ray's strong protest a viva voce vote disclosed a large majority in favor of the adoption of the conferrees' report. Ray demand a call for a quorum. A roll-call showed the presence of a quorum, and the report was adopted.

The bill now only needs the President's signature to become a law.

THE production of the Rand for September showed a falling off from the previous month, due, it is said, to the scarcity of native labor. The record for 1893 is as follows:

	Ounces.
January	108,374
February	93,252
March	111,474
April	112,053
May	116,911
June	122,907
July	126,169
August	136,069
September	129,585

The record for the past seven years has been as follows:

	Ozs.		Ozs.
1887	23,155	1891	729,237
1888	208,121	1892	1,210,868
1889	369,557	1893 (partial)	1,056,794
1890	494,817		

The total output of the Rand to date is 3,857,482 ounces, or about $75,000,000. California has produced altogether $1,300,000,000. It will thus be seen that South Africa will have to do a great deal of very hard hustling before it makes good its boast that it is going to beat the California record.

CONGRESSMAN NEWLANDS, of Nevada, is of opinion that after the Sherman law is repealed the administration will favor a measure that will retire all the present one, two, five and ten dollar currency notes and substitute silver in their place by coining the bullion now stacked up in the treasury. The design will be to educate the people of the East to the use of silver money, and in that way perhaps bring about a more friendly feeling for the white metal. The prejudice of Eastern people against the use of metal money, and their preference for notes, arises largely out of tradition and custom. There are the best of reasons why they should use metal money, and it is hoped and believed that this desirable end will finally be accomplished.

Silver Purchases Stopped.

The repeal bill is now a law, and the Government has totally suspended its purchases of silver. The power of the administration and the clamor of banking and financial circles for repeal finally broke the spirit of the minority in the Senate. The final vote was reached there Tuesday. The amended bill was on Wednesday rushed through the House with indecent haste and immediately signed by the President.

It is too soon to state what the effect of repeal will have on silver. The market has declined, but not as seriously as might have been expected. The effect of repeal seems to have been largely anticipated, and the hope of favorable subsequent legislation has checked any very heavy slump. The administration will doubtless seek to control any bill that may be presented hereafter in the interest of silver; but it has yet given no sufficient indication of what it wants. It is said that the retirement of all paper money under $10 will be sought, and the use of metal money substituted. Bills are the sole media of exchange in the East, but there is no good reason why the silver should not be substituted. Remedial legislation of this kind will be inadequate to restore silver to its place as a money metal, but it is something to have the entire United States accustomed to the sight and use of silver.

The bill as passed by the House and Senate, and signed by the President, is as follows:

Be it enacted, etc., That so much of the act, approved July 14, 1890, entitled "An act directing the purchase of silver bullion and issue of treasury notes thereon, and for other purposes," as directs the Secretary of the Treasury to purchase, from time to time, silver bullion to the aggregate amount of 4,500,000 ounces, or so much thereof as may be offered, in each month, at the market price thereof, not exceeding $1 for 371.25 grains of pure silver, and to issue in payment for such purchases treasury notes of the United States, be and the same is hereby repealed. And it is hereby declared to be the policy of the United States to continue the use of both gold and silver as standard money, and to coin both gold and silver into money of equal intrinsic and unchangeable value, such equality to be secured through international agreement, or by such safeguards of legislation as will secure the maintenance of the parity in value of the coins of the two metals, and the equal power of every dollar at all times in the markets and in the payment of debts. And it is hereby further declared that the efforts of the Government should be steadily directed to the establishment of such a safe system of bimetallism as will maintain at all times the equal power of every dollar coined or issued by the United States in the markets and in the payment of debts.

Foundry Notes.

THE California Wire Works have just forwarded to St. Louis the second of an order for 14 wire ropes placed with them several weeks since. The weight was 40 tons (79,283 pounds), length 28,300 feet, diameter 1¼ inches, and 40 horses were needed to haul the great load to the railroad freight yards, where the rope was forwarded to St. Louis via the Atchison, Topeka & Santa Fe. Two more ropes are ready for shipment and will shortly be sent on. Of the remaining ten, one will be the largest ever turned out by the California Wire Works, and, therefore, the longest and heaviest in the world. It will be 31,500 feet long, 1 5-16 inches in diameter, and will weigh 103,000 pounds. This will exceed by 3000 feet the longest cables previously turned out by the works, and by nearly 8000 feet the record-breaker recently manufactured in England. The California Wire Works have been awarded the medal for wire rope and cables at the World's Fair. The exhibit of A. S. Hallidie secured three medals, one each for ropeway, grip pulley, and cable railway. Mr. Hallidie has donated his historical cable-railway exhibit to the new Columbian museum at Chicago, where it will be displayed permanently in connection with other interesting exhibits from the World's Fair and elsewhere. The chief feature of this collection, it will be remembered, is the original car and dummy used by Mr. Hallidie on Clay street in 1873, and presented to him by the Ferries & Cliff House Railway Company (successor of the Clay street line).

THE Parke & Lacy Company have recently furnished a ropeway 15,000 feet between centers for the Compania Minera de San Andreas de la Sierra of Durango, Mexico. It is to be used for the conveyance of charcoal and wood, and, having a very severe grade, will be operated solely by gravity. The length of the ropeway is notable. With the same shipment were forwarded two hoisting engines, boilers (75-horse power) with feed pumps, pumps for mine, Ingersoll-Sergeant piston inlet compressor, Ingersoll drills, etc. Among other mining appliances recently furnished by this firm is a Dodge pulverizing plant to the Arkansas & San Antonio Mining Co., of Kingman, Arizona, and another to the Porfirio Diaz Gold and Silver Mining Company of Sonora, Mexico.

THE Union Iron Works have just shipped a five-stamp mill with iron frame, engine, etc., to the Drew Mining Company, Woodville, Oregon.

THE status of ownership of an unpatented mining claim is that the holder has simply a possessory right, which does not confer title, but entitles a person who has made and marked his discovery and performed and kept up the work necessary to a valid and subsisting location, for the purpose of developing the mine, to the exclusive possession and enjoyment thereof against the whole world. As this right of possession entitles the party to work the mine, take out its ore and appropriate it to his own uses and profit, it is a valuable right and accorded full protection by the law.

River Protection and Hydraulic Mining.

By Senator Tirey L. Ford of Sierra County.

I have heen freqnently asked what interest the general Government has in the construction of works for the restraining of mountain dehris, and what duty rests upon the general Government in that behalf. As a partial answer to tbese questions, the following is submitted:

It goes without saying that the navigahle streams of California must he protected. It is also true that commerce needs the millions of gold now locked up in the hydraulic grâvel beds in the Sierra Nevada mountains. These desirable objects can both he readily attained through the proper application of engineering skill, and at a cost that need he bnt trifling when compared with the transcendent value of the results to he accomplished.

In order to better appreciate the character of means necessary to accomplish these dsirable ends, it is well to understand something of the canses that have led to the present condition of affairs.

It is a well known geological fact that the Sacramento valley was once a vast inland sea, and that when an outlet was made for its waters through the Golden Gate, its bed was left covered to an immense depth with the accumulated sediment of prehistoric centuries. The vast watershed of the surrounding monntain ranges continued to pour its annnal volume of water into the new-created valley and a central channel or river hed was the necessary and natural result. Thus came into existence the Sacramento river and its numerous trihutaries. Then began that peculiar geological process from which resulted the strange anomaly of a river followiug the einuosities of the elevated rather than the depressed portions of a great valley. The cause for this seemingly unnatural condition of aflairs is quite apparent and easy to understand. From deep canyons and mountain gorges, from sloping hillsides and sheltered vales, there came annually vast quantities of earth and detritus ponring into the river channels; and, as the heavy rains of spring joined the rushing waters from the melting snow, the swollen rivers were unahle to csrry their tremendous burdens, and, as a result, the earth and detritus brought down from the higher altitndes overflowed into the adjoining country where the same were deposited. Thus the banks of the Sacramento river and the adjacent land were gradually raised, year hy year, through the deposits thns annually spread over them, with, of course, a corresponding elevation of the river bed from like deposits, until to-day the Sacramento river is virtually the center of a ridge meandering through the Sacramento valley.

Such was the condition of aflairs when civilization, in its westward march, crossed the mountain barriers that guard this empire of the Pacific. Then the causes which had led to the gradual filling up of the river channel, and the corresponding elevation of the river banks and adjacent land, were suddenly multiplied. Among these additional causss may be mentioned the following:

The most potent factor added by man consisted in the construction of artificial hanks or levees along the river channels. Prior to the building of levees the overcharged rivers found relief through numerous sloughs and natural outlets that aided in keeping the dehris-ladened waters within the confines of the river channel proper. When the rains of spring, however, hrought down the melting snows from the mountains, the rushing waters, with their hurden of accumnlated dehris, overflowed and spread out over the adjacent country, carrying with them the larger part of such accumulations and leaving a smaller part only in the river channels. Thus, while the river hed was gradually filled and raised, the hanks of the adjacent lands were receiving their quota of sedimentary accretions, and were keeping company with the river hed in its gradual elevation. The levees put a stop to all this. By cntting off all means of escape through sloughs and other natural outlets, the levees confined the waters to the river channel proper and thus imposed upon the rivers a new and heavy burden. Nor was this all. When the freshets of springtime came with their volume of earthy sediment, the river hed was compelled to receive the entire deposit of accumulated sediment, except such as found its way through broken levees into new and unaccustomed places, or was carried in suspension to the hroad waters of our western sea. Thns the river channel, unable to relieve itself through its accustomed outlets and overflows, became more rapidly filled with mountain dehris, necessitating constant additions to the levees on either side.

A second and powerful added cause was the denudation of the mountain-sides of their magnificent forests. Before the inauguration of the gigantic lumber enterprises which, aided hy numerous forest fires, have rohhed our mountains of their best friend and protector, the washing down of dehris from the rocky soil of forest-covered mountain-sides was far more difficult and gradual than now. The protection aflorded by the forests was twofold. First, the shade of the forest caused the winter snow to melt more gradually, and, as a consequence, the freshets of spring were less frequent than now. Second, the roots of the trees, interlaced and interwoven with one another as they were, held the loose and rocky soil in place and provided a sponge-like receptacle for the water created by the melting snow. But now the forests are gone, the snow melts more rapidly, spring freshets multiply, and the loose and rocky soil, no longer held in place, is washed down into the canyons and thence into the levee-choked streams of the valley.

Again, tbe thousands of small farms and gardens scattered throughout the mountains have heen constantly loosening the soil and sending it on its way to the valley helow.

Another factor of no mean proportions is the grazing of numerous flocks and herds of sheep and cattle throughout the mountain regions. Only those who have lived in the mountains and witnessed the constant destruction of roads and trails hy vast droves of cattle and sheep can appreciate the prodigious amount of damage done hy the means ahove suggested. The naturally loose soil of steep mountain sides is still further loosened and made an easy prey to the ever-suhduing freshets of our rainy season.

The last of the causss added by man to the filling up of our valley streams was that of hydraulic mining. This industry, while it added to the flow of detritus from the mountains into our navigahle streams, did not and could not produce such serious and far-reaching results as some of the other causes above mentioned. This is now a generally recognized and admitted fact, though for a time, and until the matter became more perfectly understood, hydraulic mining was given undue prominence in the discussion of the causes that were productive of injury to our navigable waters. Nor was this without apparent reason, for the results of hydraulic mining were at once ascertainable and mathematically demonstrable, and, quite naturally, first attracted puhlic attention, while the more powerful, though less sharply apparent causes, escaped for a time the attention that has heen more recently directed to them.

A moment's reflection is sufficient to convince any reasonable man that the hydraulic miner, operating hut a few months in the year, in isolated places within a limited area of the placer mining belt, can send to the valleys hut a small accumulation of detritus as compared with the powerful and constant agencies unceasingly at work throughout the entire length and breadth of the Sierra Nevada mountains. The work of depositing detritus from the mountains and foothills in the valley streams and upon adjacent lands began centuries hefore hydraulic mining hecame a recognized industry, and, unless checked hy the application of appropriate means under governmental direction and authority, will continue for centuries after the last gravel hed has disappeared from the auriferous regions of California. The miner does not ask that the levee harriers be removed or that the lumberman be restrained in his devastation of the monntain forests, or that the thousands of small mountain farms and gardens he abandoned, or that the stock-raiser be prohihited from making a proper use of mountain ranges, but he *does* ask that the injuries wrought by nature, aided and ahetted hy the levee huilder, the lumherman, the forest fires, the gardener and the stock-raiser, be not all charged to the one comparatively small industry of hydraulic mining.

It is the plain duty of the General Government to protect its navigable waters—a duty fully recognized by the Federal authorities. Nor should the Federal Government be wholly unmindful of those to whom it has sold its puhlic lands. The farmer is entitled to whatever protection the Government can reasonahly afford him, and will, of course, reap the henefit of whatever means may he adopted hy the Government for the protection of its navigable streams, for the protection of the streams will mean the protection of the adjacent lands; and the hydraulic miner, who purchased his land from the Federal Government, with the full knowledge upon the part of the Government that the land thus purchased was to he mined by the hydraulic process, is entitled to some consideration at the hands of those who make and enforce our Federal laws.

Just how the Government should perform its duty with reference to the preservation of the Sacramento and Feather rivers has been a much discussed question and a suhject of repeated engineering experiments. It is clearly impracticable to properly preserve the rivers in question under the methods heretofore employed. The cessation of hydraulic mining (and there has been suhstantially no hydraulic mining for some years past) has not tended in any appreciahle degree to aid in the solution of the question, for it was but one of many causes leading to the same result. Nor is it wise to restrict the production of gold except for grave and clearly sufficient reasons. It is equally undesirable to prohihit or hamper the other important industries that have done much toward filling up our valley rivers, and no one wonld ask for the removal of the restraining levees notwithstanding their constant tendency to choke up the rivers with accumulated sediment. Lastly, it is absolutely impossihle to stop the neverceasing work of nature in her eflorts to level the mountains and wash them into the sea. There is then but one course to pursue, and, thanks to the genius of American engineers coupled with the practical experiments of the last few years, that course is now a plain, certain and feasihle one. It has heen fully and clearly demonstrated, hy means that no longer admit of the slightest question, that it is practicahle to construct restraining works and settling basins that will effectually impound all dehris from whatever cause arising that could work any material injury to the navigable streams or adjacent lands. Innumerahle sites, admirahly adapted for tbe construction of such works, can he readily found all along the mountains and foothills with abundant material for their construction immediately at hand. As was aptly said hy Senator Cross at the recent annual meeting of the California Miners' Association, the Almighty has prepared and placed at our disposal storage sites of unlimited capacity that only require a reasonable expenditure under proper engineering skill to be made availahle for the full and complete protection of every interest affected hy the flow of detritus from the mountains.

A practical view of the question was taken by our State Legislature at its last session when the plan here suggested was given the sanction of legislative endorsement. After wrestling with the question in its multifarious forms and phases for over ten years, the law-making body of our State finally adopted a policy based upon that true, though homely, adage, "An ounce of preventive is worth a pound of cure." It was ascertained that it would he far less expensive to lodge and permanently impound the dehris in mountain canyons and foothill basins than to remove the same after it had reached the valley streams. In fact the latter method, in view of the added material confined to the streams by the present system of levees, was found wholly impracticable and totally ineffective. After defining the term "hydraulic mining," as used and understood in California, and laying down the principle that hydraulic mining might he carried on wherever the same could be carried on without material injury to other interests, which was but a restatement of the principle laid down by our State and Federal courts, the Legislature proceeded to enunciate its policy concerning the protection of our rivers and valley lands from the flow of mountain dehris. The sum of $250,000 was appropriated for the purpose of constructing the necessary restraining works and a Commissioner provided who should superintend the construction of the same. This appropriation, however, is not to become availahle until Congress shall have appropriated at least as great a sum for similar purposes. In addition the Legislature provided for a system of public works, under the supervision of a compstent Commissioner, which should include the construction of artificial waterways to relieve the tremendous burdens imposed on our valley rivers at flood time, and thus compensate, in some degree, the unavoidahle evils of our levee system.

California has so far certainly done her full share toward working out a just and final solution of this more than ordinarily important question. The Federal Government can as certainly not afford to do less. Congress has already awakened to the necessities of the situation and has manifested its good intentions through the Congressional act commonly known as the "Caminetti Act," which has for its purpose the regulation of hydraulic mining and the protection of our navigahle streams. Let the good work so happily begun be carried on to a successful conclusion. Let financial aid come from the Treasury vaults at Washington to he supplemented by contrihutions from the Treasury of our own State; let American genius point out the way; and let well-paid American lahor construct the necessary works. Then will the songs of prosperity once more echo through the hills and canyons of our loved Sierras; the contented farmer in the valley will rest in conscious security; while millions of gold will be added to the channels of commerce; and the relieved waters of the Sacramento will flow "unvexed to the sea."

TIREY L. FORD.

NOTWITHSTANDING repeal of the purchase clause of the Sherman law, Colorado takes a hopeful view of the situation. The effect of repeal has heen anticipated in that State, and it has already directed its attention to development of its other fine resources. The opinion is generally expressed in Denver that repeal will aid rather than retard the cause of silver, and that a reaction is certain to be hrought ahout hy the necessity of the country for an enlarged use of silver. Meanwhile Colorado expects to produce from one-fourth to one-third the total gold output of the United States for 1893, and to that end is developing its gold fields with characteristic energy.

Slickens.

THE Herold Mill and Mining Company have filed a petition in insolvency. Its liabilities amonnt to $2151.92.

THE De Lamar Mining Company, of Idaho, October 24th paid its tenth dividend at the rate of 25 cents per share, amonnting to $100,000.

THE Homestake Mining Company of South Dakota paid its 133d consecutive dividend at the rate of 10 cents per share, aggregating $12,500, on October 25th.

TEN stamps are to be added to the mill of the Spanish mine, Nevada county, recently purchased by Colgate & Co., New York. Developments have been most satisfactory.

A NEW Colorado gold camp has been started sonthwest of the town of Monnment, which is abont 20 miles north of Colorado Springs. A large uumber of location certificates have been filed.

A NEW ledge has been discovered in the Crown Point quartz mine at Grass Valley. The ledge is abont 60 feet northeast of the main ledge, and is three feet thick, showing free gold, sulphurets and galena.

THE Alpha Consolidated Mill and Mining Company have re-elected the old officers, with Charles Hirshfield as president, A. K. P. Harmon vice-president, Cbarles E. Elliott secretary, and A. C. Hamilton superiutendent.

THE New York Placer Mining Company has incorporated to work mines in California. Directors—W. G. Roberts, Wm. E. Sbephan, Eugene J. Duffy, C. A. Malm and Joseph Roylance. Capital stock, $9000, and $250 subscribed.

THE Altman Gold and Silver Mining Company has incorporated to operate in El Dorado county. Directors—Wm. A. McNanghton, Edward A. Ayer, Daniel Hanlon, A. M. Brown and D. M. Angier. Capital, $2,000,000, and $500 snbscribed.

THE Sunset Gold Mining and Milling Company has filed articles of incorporation in this city. Directors—Geo. Beebe, Delos Pratt, Thomas R. Dunn, Mark Webber and Orson H. Elliott. Capital stock, $400,000, of which $40,000 has been snbscribed.

ARTICLES OF INCORPORATION have been filed iu tbis city on behalf of the Cienega Land, Marble and Granite Company. Directors—F. A. Berlin, M. H. Turrill, T. B. Key, F. P. Bacon, J. J. Burt. Capital, $1,000,000, of whicb $100,000 has been actually subscribed.

THE Black Hills Gold and Silver Extraction Mining and Milling Company has moved from Hill City to Deadwood, S. D. The company owns the exclusive rights of tbe cyanide process for the Black Hills. A mill has been in course of erection, and will soon be completed.

BETWEEN Jannary 1st and August 31, 1893, the mines of the Broken Hill Proprietary Company, Australia, prodnced 8,037,668 ounces of silver, and all Broken Hill mines 9,146,762 ounces. There seems to be no diminution of the Australia ontput despite the low price of silver.

THE Belmont mine, of Gilpin connty, is reported sold to California men for $150,000. A Colorado paper makes the sage remark that Colorado men go to California to bny mines and California men come to Colorado for the same purpose. The best things are always a long way from home.

THE Johannesbnrg (Transvaal) *Moon* of September 9th contains a fnll page portrait of Mr. Charles Butters, well known in this State. Comment of the *Moon* on the illustration is: "The portrait of Mr. Charles Butters, the eminent metallnrgist, jnst hits the bull's-eye in the middle." The *Moon* meant to cast no reflections ou Mr. Butters.

THE following appointments to positions in the San Francisco Branch Mint have been made: Jesse S. Wall of Alameda, cashier; Cbarles M. Otrom of Modoc, chip clerk; Wm. S. Linn of Alameda, helper; James Joyes of San Francisco, doorkeeper; John M. White of Santa Rosa, condnctor; John E. Graves of Monterey, watchman. The appointees have assumed their positions.

THE following is the cabled estimated return of Harqua Hala for the month of September: Crnshed during the month, 2700 tons; gross value of gold produced, $32,000; estimated total expenses, $11,200; estimated profit, $20,800; add miscellaneons revenue for qnarter ending September 30th, $1500—$22,300. The directors have declared an interim dividend of 18c per share (free from income tax) for the qnarter euding September 30th.

THE steamer Topeka, from Alaska, brought to Victoria on Sunday a uumber of Ynkon miners whose combined pile of "dnst" amounted to $60,000. They say there are some 300 prospectors in the conntry and all mainly doing well, there being enough gold there for the work. The men who go in, however, must be prepared to rough it. The results of mining for the past snmmer have been fitful, some men doing well and others the reverse.

A MINING camp for the Midway Plaisance at the Midwinter Fair is proposed. Admission will be charged. It will consist of one street, with a mountain backgronnd showing flumes and mines in operatiou. The streets will have "The Rest for the Weary" hotel and "The Dew Drop Inn," also a canvas saloon with the sign "Keno Here To-night." The arrival of the stage, the prospector driving his bnrro and other incidents to enliven it will be introduced.

THE Caruth Gold Mining Company has been organized at Baker City, Or. The capital stock is fixed at $1,500,000, divided into shares of $1 each. The incorporators are C. A. Johns, N. A. McMillan and J. H. Parker. The mines iucluded in this incorporation are what is knowu as the Norwood group, south extensions of the Virtue mine and which are being developed under a working bond to Messrs. N. A. McMillan and John Bolland, of Fort Worth, Texas.

THE dredging and amalgamating process is abont to be tried on the fine gold of the Columbia and Snake rivers. The matter is receiving the snpport of capital, and as a result three boats are being fitted np near Pasco. The largest of these will carry the dredging macbinery (Bncyrus). The second carries the amalgamator (Bennett), while the third serves as a supply boat to carry fnel and stores. The machinery is to be honsed in, and the boats fitted up so that work can be done with considerable comfort in all kinds of weather. The managers of the new project are anxions to get the machinery in place as soon as possible, and give the scheme a test before the winter begins.

ARTICLES OF INCORPORATION of the Pine Monntain Mining and Milling Company have been filed. The objecta as stated are to purchase and operate and mill properties in Pine Mountain mining district, connty of Inyo, Cal. The bnsiness is to be transacted at Big Pine, and the corporation to exist for 50 years. The directors are J. H. Bnlpitt and R. J. Scbober, Bishop; C. A. Collins, Laws; R. W. Thomas, Big Pine; P. W. Forbes, Independence. The capital stock is $20,000, divided into 20,000 shares of $1 each.

A YAKIMA (Wash.) man has an invention designed to elevate water for irrigating pnrposes. He claims that it is the most successfnl device yet invented for raising water by the power of the stream from which it is taken. An iron paddle-wheel, with long, thin steel paddles or wings, is placed near the bottom of a stream, at the small end of a long sheet-iron flume or cylinder. The cylinder is large at the upstream end, and the water, being forced through it, accnmnlates a strong head at the small end. To the wheel is attached a sprocket wheel and endless chain by which a bucket elevator or pump on the shore is operated. It is claimed that water can be raised to a height of 25 feet, and in snfficieut qnantity to irrigate a 160-acre farm.

IN all the experiments made with sulphurets that come out of the river between here and Empire, says the Dayton (Nev.) *Times*, it is fonnd that gold largely predominates in them. The ore worked in tbe mills on the river has been mostly silver ore, some gold, of conrse, being mixed in with it, but as it is easier to save the gold than silver when crnshing the ore, it is strange why gold predominates to snch a large degree in the sulphurets. There is only one way we can see that this can be accouuted for, and tbat is that the gold must come from the washes that have occurred from time to time for ages part. There is gold in almost every pound of dirt on all the hills arouud here, and the floods and rains have probably washed a great deal of it into the river, where it has been caught to considerable exteut by the amalgam and qnicksilver that has flowed from the mills.

England and the Midwinter Fair.

The London *Mining Journal*, one of the oldest and best of Englisb mining papers, in a recent issue contains an extended notice of the proposed Midwlnter Fair in San Francisco. It reviews the hlstory of the enterprise and says:

"Our American cousins are evldently not satisfied with having brought together at Chicago the very biggest thing in exhibitions the world has ever seen. They sigh for more World's Fairs, and they propose to have one at San Francisco. This show, wbich promises to be big also, though it is unlikely, of course, to assume the enormous dimensions of the Chicago display, will be a midwinter instead of a summer exhibition. It will open on January 1, 1894, and remain open for six months.

"As California spells nuggets—or did—the exhibition may be expected to hold open especial indncements for mining people. When the average English reader hears the words San Francisco he immediately thinks of Bret Harte and *The Luck of the Roaring Camp*. Visions of mining camps, "squar men," "heathen Chinese," and lovely young school "marms" in big top coats and heavy boots, immediately arise before his eyes. But the California of which Bret Harte sings so well no longer exists save in the author's fertile vision. It is many years since Mr. Harte left California to make his home in England, and since that time there have been many changes in his native land, especially in the States bordering on the Pacific ocean. Forty years will make as many changes in a comparatively new country as centuries would in an old and well developed land such as England. The rough mining camps of the early days, with their frame shanty "bars" and gambling saloons, have given place to handsome churches, luxurious hotels and busy factories. There are now a million and a half people where Bret Harte travelled for days meeting only a stray prospector engaged in his indefatigable search for gold. San Francisco is the eighth city in the United States. The "heathen Chinee" is still with the Californians, however, there being over 70,000 of the almond-eyed ones in the State. While gold mining is not the only industry in the country, it still holds its own as a producer of wealth. Since the discovery of gold in 1849 the production of California's gold mines has added $1,250,000,000 to the bullion wealth of the world and a still larger amount is believed yet to remain to be mined. But now mining has settled down to a business basis, and the mining people are no longer the rough and uncouth characters depicted by various writers, but they are intelligent, enterprising, and hospitable, and mining is pnrsued amid all the surroundings of civllization.

"But the Californian of to-day does not spend his time in seeking for gold only. The people have realized that the soil may yield more wealth than the mines. The lovely climate, whose balmy skies rival those of Nice and Cannes, and the fruitful soil make agriculture a pastime. The wheat crop of the State in 1892 was 38,554,000 bushels, the raisin crop 57,162,000 pounds, petroleum products 500,000 barrels, barley crop 12,333,000 bushels, wool crop 34,000,000 pounds, wine crop 15,000,000 gallons, and brandy product 2,000,000 gallons, and of fresh fruit 108,828,667 pounds were shipped from the State. In manufactures and fisheries as well as mining and agriculture the State made a favorable showing. The total value of San Francisco manufactures in 1892 was $94,000,000 and the average annual product of the California fisheries is $4,500,000. But enough of dry statistics, we have given figures enough to show that big nuggets do not form the sole topic of conversation in the polite circles of San Francisco. On the contrary, civilization has reached such a plane in San Francisco that it is possible to hold an International Exposition of the arts and sciences there."

Advice to Tenderfeet.

In a late issue of a Utah exchange, E. R. Cody gives advice to prospectors and tenderfeet. A prospector's outfit, he says, should consist of two ponies or jacks, a pail, pick, shovel, compass, gold pan, tin plate, tin cup, knife, fork, spoon, coffee pot, four double blankets, oil-cloth coat, rubber boots, a small tent and a supply of provisions.

The first thing to do is to examine the gravel and boulders of the mountain streams and note carefully the structure and character of the gravel wash. This will reveal the geological formations that are intersected by the streams. Try the sand at the head of the gravel bars for free gold, or any crystallized mineral-bearing quartz. If the structure of the quartz boulders or vein matter is favorable, go up the stream until the geological zone is found that has produced the quartz or other mineral-bearing rock; then follow the supposed mineral-bearing zone on its line, and make especially careful examination wherever eruptive dykes are found intersecting the formation. When a lode or vein is found, note carefully its relation to the country rock, especially any difference in the opposite walls of the vein; then follow it on the line of outcrop, and note carefully the points where the best ore is seen, so as to determine the position of the best ore chutes before making any location on the lode.

The first work should consist of shallow cuts across the vein at intervals of 50 to 100 feet, or if the vein is small and partially covered with soil and debris, a small trench along the line of the outcrop is preferable. If the surface is stationary and the true line of the strike has been determined, then survey your claim and stake off its boundaries according to the requirements of the laws of the United States.

Exploring the vein underground is the next thing in order. To do this intelligently you must select that point on the line of outcrop where the best ore is found; then sink a shaft on the vein following the angle of dip, keeping both foot and hanging walls exposed, if possible. If the vein is too wide for this to be done, follow the best or streak of the vein itself, and every 50 feet in depth run a crosscut to the walls of the vein.

After 100 feet depth has been reached, run lines each way from the shaft on the line of the vein, in order to determine the extent or spread of the ore chute or chimney on the horizontal line. When the limit of the ore body on the horizontal line has been ascertained, sink 100 feet more and drift right and left as before. If more than one chimney of ore is found on the line of the vein within your boundary lines, a shaft should be sunk on it also and drifts run as above stated, being careful always to confine all exploring work within the walls of the vein.

When enough has been done to prove the character, size and quality of the vein, it will then be time to determine the position, character and extent of dead work necessary to work the mine to the deep. These questions should be settled by careful survey, made in the light of all the local facts and surroundings, such as the geological structures of the country rock, the probable amount of water to be raised and the most convenient point of drainage by adit or level, and the most convenient point for the delivery of the ore to the surface, etc.

The last part of the preliminary exploration of any vein is to determine by actual tests what are the best methods of reduction and the extent of capacity, kind of reduction works needed, etc. After all these preliminary facts have been thoroughly ascertained and clearly defined, the unavailable risks of mining will have been fully met and overcome. All subsequent operations are simply a matter of skill and business management, and the capitalizing of the mine becomes a mere matter of business detail.

The first requirements are as follows:

First—The preliminary exploration must have ore enough cut, or under-run, or otherwise exposed, to give at least two years' work for a reduction plant of an extent for the annual average output of ore.

Second—The reduction plant must be suited for the best treatment of the ore.

Third—The exploration of the mine must be pushed ahead of the extraction of the ore, so as to expose at least one ton of ore in new ground for every twenty tons extracted from the previously explored ground.

A Point for Millmen.

Written for the MINING AND SCIENTIFIC PRESS by C. H. Aaron.

A good many years ago I was pervading, more or less, a certain assay office in this city. Among the students of practical, commercial assaying and analysis was a youog man who had graduated at the nniversity and had gone throngh mathematics up to, though not into, fluxions, yet was completely non-plnssed when a man came in with a note of the assay valne of his ore, his concentrates and hls tallings, and wanted to know how many tons he had "put into one."

The man had no note of weights, and onr "'varsity man" said the qnestion could not, therefore, be answered. I thought so myself at first, hut after the man had gone I perceived that it was a simple problem which could he solved hy means of the rule hy which grocers mix sugars of different grades to produce a given intermediate grade, though, having happily forgotten that rnle, I got the required answer by applying a modification of one of my rules for finding the weight of gold in a quartz specimen. (*V. Assaying, Part I, by C. H. Aaron, for sale at this office.*)

The student could hy no means make it out, and this is an illnstration of the difficulty which highly edocated *young* men find in applying their knowledge to practical uses, though, no donbt, if the question had come in the time-honored form of the sugar, or sugar-and-sand problem, he would at once have recalled his Cocker.

Either of the methods mentioned, however, reqnires a little secondary work to reach an answer to the question, "How many tons have been put into one?" And I have fonnd a neater and simpler solntion which may be new and will surely be useful, especially in the application which I shall point out. Algebraically it is as follows:

Headings assay per ton, 127 oz. $= a$.
Tailings " " " 6 " $= b$.
Ore " " " 34 " $= c$.

$$a + b(x - 1) = cx$$

expanding and transposing,

$$a - b = cx - bx$$

snbstituting values of a, b, c,

$$121 = 28x$$
$$x = 4.3214,$$

that is, 4.3214 tons of ore were reqnired to produce one ton of headings (concentrates). This gives us the following arithmetical

RULE.—*From the assay value per ton of ore and of headings, respectively, subtract the assay value per ton of tailings; divide the lesser remainder by the greater, the quotient is the answer sought.*

Thus in the ahove example:

$$127 - 6 = 121$$
$$34 - 6 = 28$$
$$121 \div 28 = 4.3214$$ tons (or parts) of ore reduced to 1 ton (or part) of concentrates.

The rule can he applied to the mixing of sand and sugar, though I do not recommend it for that purpose.

As Bunsby would say, "The bearin's o' this 'ere observation lays in the application of it." Not only can we find out how many tons have been put into one, but, lf the headlngs he dried and weighed, we can ascertaln how many tons in all have been crushed by mnltiplying the number reqnired to produce one ton of headings by the total weight of headings in tons; thus, in the example given, if total headings weigh 6.617 tons, then $6.617 \times 4.3214 = 28.595$ tons must have been crushed. If the sampling and assaying have been correct, the weight of ore crushed is known with corresponding exactitude, even though it may not have heen weighed to the battery. Even if it has heen weighed, the method affords a check free from complication of moisture.

It may be necessary to say that for this pnrpose, if the ore contains free gold which is amalgamated in hatteries or on plates, the sample for ore assay must he taken from the pulp delivered to the concentrators. The assay value of the orlginal ore may then he known by dividing the value of the amalgam hy the number of tons crushed, and adding the result to that found by the assay of the pulp going to the concentrators, and probably more accurately than by sampling from the rock-breaker—the only alternative when battery amalgamation ls practiced. C. H. AARON.

The Situation at Johannesburg.

A Montana miner, C. Y. Reeder, who recently arrived in Sonth Africa, sums up the situation there in a letter to a cousin at Butte. It will be found interesting reading to those who contemplate a journey to the Mecca of impoverished miners, Johanneshurg. That city is discribed as a most wonderful mining camp. The population of 25,000 is one-half native Kaffirs. This class do all the menial lahor in and ahont the city and also all the mining and other work ahont the mines and mills. These Kaffirs or hlacks receive for their lahor ahont the stores, hotels and residences in the city from 5 to 15 shillings per week. Those who work in the mines and around the mines and mills receive from 10 to 17 shllliogs per week. At the mines they are furnished with rations of "mealies" or cornmeal in addition to their pay. At some of the mines they are also furnished with a ration of meat once a week and at others twice a week.

"From this statement you wlll see," says Reeder, "that this country is no place for the American mloer or the poor white laborer. There is room here for expert miners, men with the ability, education and qualifications for managing properties aod controlliog and hossing the labor in the mines and superintendiog the construction of mills, etc. I am told that from 4 ceots to 10 cents at the most will keep a Kaffir per day. I have not yet ioquired what salaries clerks and bookkeepers and that class of employes receive.

"Hammond, Clements and Conners of California arrived here one week ahead of me to enter the employ of Baroato Bros., Hammond as an expert at a salary of $20,000 per year, Conners as an eogineer at a salary of $12,000 per year and Clements as mine manager at a salary of $6000 per year. Mr. Clements had charge of the Sullivan & Bunker Hill mine in the Cœur d'Alene country during the trouble there.

"Many English mine managers' heads are being chopped off and American experts are taking their places. A. G. Phillips, once with the Moulton Company, was made manager of the Reitfountain mines and mills Ang. 10. There is room here for a limited numher of first-class mechanics of all kinds. Board and lodgings at hotels from $15 to $20 per week. The smallpox is bad here, hut I am not afraid of it."

Tellurium and Selenium in California.

Reprinted by request from the report of the State Mineralogist for 1884.

The following letter contains a great deal of information concerniog the tellurium minerals in California:

Henry G. Hanks, San Francisco, Cal. DEAR SIR:—In answer to your question respecting the localities where tellurium is found in California, I can say that I have seen it in considerable quantities in Mariposa county, especially on the Merced river, not far from the Marhle Spring mine. I have heard of it in the ores of the Mariposa Company and have seen specimens said to have come from that property. Following the western branch of the mother vein, north, tellurium is found in large quantities in the Rawhide mloe, near Chinese Camp, and in many mines around Tuttletown. Crossing the Stanislaus river, at Robinson's ferry, tellurium is found in masses, accompanied with massive gold, in the Stanislaus mine, and as tellnride of lead in the Adelaide mine. In the Morgan mine, it appears as calaverite, petzite, and sylvanite, accompanied by gold in large masses; also, telluride of lead carrying gold. All the mioes on Carson Hill where the Morgan mine is situated, have ores more or less associated with tellurium or tellurium compounds. I have heard of tellurium in Placer connty, and I have seen it in Nevada, Butte, and Sierra counties. In Slerra county In the the Oriental mine, very fine ores of tellurium are fonnd associated with free gold and arsenical pyrites rlch in gold. In the Murchie mine, Nevada county, very fine tellurides are found, and also in many mines on Feather river.

Ores of tellurium are difficult to work. In the raw way this mineral is detrimental to and sometimes utterly prevents amalgamation. It is volatile and disappears in roasting, carrylog the gold with it, unless the greatest care is taken.

In *all* cases that have so far come under my observation the ores containing tellurium are very rlch in gold, the tellurium invariably heiog rich in precious metals. In Bowlder county, Colorado, I have seen a compound of lead and tellurium, but in California I have never seen a simple compound of this sort—gold is always a factor and generally silver also.

Higher up in the mountains selenlum is found also associated with gold. At the Oro Plata mine, in Murphy's, Calaveras county, seven miles from Carson Hill, compounds of selenium, gold, and copper are found. The mineral here ls not massive, hut exists in segregated crystals, very minute. The per cent of mineral in the ore ls rarely over one-half of ooe per cent and generally less than one-elghth of one per cent, hut the coocentrates of this mineral are worth from $4,000 to $8,000 per ton. I have tested tellurium worth from $40,000 to $80,000 a ton from the various mines I have mentioned. I have an idea that tellurium accompanies the western hranch of the mother vein throughout the State. I helieve when more attention is paid to the refractory ores of Californla that tellurium and selenium will he found very valuable additions to the gold-hearing rocks of the State and worthy speclal study. Very trnly yours, Z. A. WILLARD.

San Francisco, March 8, 1884.

Treatment of Nickel, Zinc, Aluminum and Tin Ores.

Extracts from Paper on American Improvements and Inventions, Read before the American Institute of Mining Engineers at its August Meetiog, Chicago, by James Douglas of New York City.

Nickel.—Untll the ore aod matte from Sndhnry, Ont., were imported, the ooly nickel commercially produced in this couotry, apart from small qnantities whlch came as a hy-product from the lead mines of Missouri, was extracted hy Mr. J. Wharton from the Lancaster Gap mine, Pa., aod converted into metal and nickel salts at his works in Camden, N. J., hy methods which were kept profoundly secret. Now that nickel-steel has created an increased demaod for the metal or its oxide, the methods of reduction have been extensively investigated. Ooe result has heen the patentiog hy Messrs. J. L. and R. M. Thompsoo, and the practical operation on a large scale hy the Orford Copper Company of a method for separating nickel from copper-oickel ores and mattes hy smeltiog the mixed sulphide of iron, copper and nickel with an alkaline sulphlde, or with acid salt-cake. On tapping the charge, sulphide of nickel, with a small proportion of the copper and iron sulphide, settles to the hottom of the pot, while the sulphide of iron and copper, with a very small proportion of sulphide of nickel and a large proportion of the salts of the alkali used, form a very distinct, easily separated, upper layer. By re-treatiog the hottoms, a still further elimination of forelgn metals is effected, until ultimately pure nickel sulphide is obtained. The consumption of alkali is reduced hy recoveriog it from the tops. The company, hy this method, puts on the market large quantities of nickel oxide made by roasting the sulphurets, and contaminated with ooly a trifling amount of iron oxide.

The oxidized nickel ores of the West have not yet entered the market extensively.

Aluminum.—The snccessful agent of recent investigation in the metallurgy of aluminum has been electricity, and this is an agent which we have not been backward in trying to harness to our metallurgical vehicle and turn to our use. This country may claim unquestionahle priority of invention for one electrical method of treating aluminons compounds, and at least independent simnltaneity for another.

The Cowles Bros. of Cleveland, Ohio, patented in 1885 a process and the necessary appliances for producing aluminum hy the decomposition of cornndum in the electric arc, and for formlog aluminum alloys hy decomposing the corundum in the presence of granules of copper and other metals. They place the alumina, whether corundum or prepared oxide, with charcoal, and the metal wlth which the aluminum is to be alloyed, hetween the electrodes of a dynamo in a carhon-lined aod covered trough. A current of ahout 8 volts and 3000 amperes is turned on; the alumina is decomposed, and as aluminum is formed, it combines with the fused copper, or other metal, and the alloy collects in globules or masses. The oxides of calcium, magneslum, manganese, silicon, harium and the alkalies are decomposed in the Cowles furnace with the production of these elements and metallurgical alloys, which it would he difficult to make otherwise.

The only other process under which aluminum and its alloys are made in commercial quantities in this country is that pateoted by C. M. Hall, and operated hy the Pittsburg Reducing Company, which "reduces the metal from its oxide alumina hy electrolysis, the alumioa heing held in solution hy a molten fluoride hath, which itself is not decomposed by the electric current. The latter is conveyed to the melted solution hy means of carhon cylinders placed in the hath for positive electrodes, a carhon-lined metal pot forming the negative electrode.

"The oxygen of the alumioa goes off at the positive electrode as carhonic acid, wearing away the carbon at the rate of nearly a pound of carhon to the pound of aluminum produced. The reduced metal settles to the bottom of the pot, from which it is easily tapped or ladled off, practical? free from the electrolyte. Re-meltiog eotirely purifies it."

There are poiots of resemblance hetween the Hall process and the Beroard process used at Creil, Fraoce, and more remote similarity hetween the Cowles system and that in operation at the large works of Mülhausen, on the Rhine.

Zinc.—Despite the wide diffuslon of zinc, and the large size of some of the zioc deposits in this country, no important improvement has heen made in its metallurgy since the invention hy Wetherill, in 1855, of a method for making zlnc white hy hurning with forced draft, on the perforated grate hars of a specially constructed furnace, a layer of anthracite pea or nut coal upon which is spread a hed of naturally or artificially oxidized zlnc ore, mixed with ahout one-third its weight of anthracite slack. The zinc is simnltaneously volatilized and oxidized, aud the white zinc collected in mnslln hags. At the New Jersey Zlnc Company's Works, at Newark, franklinite ore from its mines at Mine

Hill, N. J., is thus treated for the extraction of most of its zinc. The remaining iron and manganese are run down into spiegeleisen, and the zinc fumes which escape from the blast furnace are treated for spelter.

There is a profitable field for metallurgical research and invention in devising an economical method of recovering the zinc from the mixed ores of lead, zinc and copper of the Rocky mountains, where they are at present far from being a source of profit, the most troublesome and wasteful element with which the furnaceman has to deal. The Cowles Bros. were experimenting in this direction, and with this aim, with their electrolytic furnace, when their attention was deflected from zinc to aluminum.

Mercury.—The mining and metallurgy of quicksilver is almost wholly confined to California. Of the total of 101,336 flasks made in the country, only about 2300 flasks are reported in the last census year from Oregon and Utah.

The *tierra* and *granza* furnaces used in California do not differ in principle or in their main features of construction from the distillation furnaces for coarse and fine ores, of Europe; but in their accessories ingenuity and money have been expended with a view to minimizing labor, while in compactness of plan and neatness of construction, the California works contrast favorably with the older European establishments.

In 1876 the necessity of saving labor led to the construc- and adoption at New Almaden of the Hüttener and Scott vertical shelf furnace, for roasting cinnabar fines. The Livermore inclined shelf furnace is a later invention.

Antimony.—At present, antimony is not made in this country in commercial quantities, though in Utah, Nevada, Montana, Colorado, and Arkansas, there are deposits of stibnite of considerable extent. In 1881 a very good grade of antimony was made from the oxidized ores of Sonora, Mexico, at Oakland, California. The reduction was effected in a low 36-inch diameter cupola, and the refining was done in crucibles; but the enterprise was short lived. The same was true of the operation of the Stayton Mining Company, who some years earlier treated antimony ores from California in reverberatories; also of the works run by Faber at Battle Mount, Nevada, on stibnite from Humboldt county, Nevada; of the more extensive establishment in Salt Lake City for treating the antimony ores of south Utah, and of a Philadelphia company, who made for a time in Philadephia a good article out of the concentrated ores of Arkansas, by the English crucible method.

Tin.—Though tin exists in Arkansas, is widely diffused from Maine to Alabama in the Appalachian range, and has been exploited in Dakota and California, the mining of it so far has nowhere been sufficiently remunerative to create a smelting industry. The concentrating mills constructed in Dakota and California include substantially the machinery and automatic methods employed in the mechanical treatment of other ores, and therefore differ widely from the dressing floors of a Cornish tin works.

A Great Pumping Plant.

Edward P. Allis, of Milwaukee, Wis., has just built for the Chapin Mining Company at Iron Mountain, Mich., pumping machinery to raise water up a vertical shaft from a depth of 1500 feet.

The great size of the engine and the depth from which the water is to be raised make this one of the most important installations of mine-drainage machinery in the United States. It is one of the few instances in which the engines are located on the surface. The details of construction, as given in the *Engineering News*, will be found interesting.

Notwithstanding advantages of direct-acting pumping engines for most cases of mine drainage, it will be seen that the conditions here practically prohibited the use of an underground engine. An engine of sufficient power to raise water from a depth of 1500 feet was wanted, but at the same time it would be some years before the shaft could reach this depth, and meanwhile the work at smaller depths had to be dralned. Again, the condensation would be very great in piping steam such a distance underground even with the most careful and complete lagging. These, with the lesser considerations of danger from accidents and the difficulty in erecting an engine of the requisite power underground largely determined the location of the engine.

The only other mine-pumping engine which we now recall that compares with this one in size is the engine designed by Mr. John West for the Lehigh Zinc Co., and erected at their mines near Bethlehem, Pa., in 1871. This is a simple engine with a cylinder 9 feet 2 inches in diameter and 10-foot stroke, and a flywheel weighing 92 tons and 30 feet in diameter, on each side of the cylinder. It operates four lift pumps 31½ inches in diameter, discharging into tanks 96 feet from the surface and four plunger pumps forcing the water to the surface. The capacity of this engine is 17,000 gallons of water per minute from a depth of 300 feet. The steam valves are balanced valves 20 inches in diameter and with a 1¾-inch lift, and the exhaust valves are 30 inches in diameter with a 3-inch lift. The size and weight of some of the parts are enormous. The power of the engine working under 60 lbs. pressure is 3000 H. P.

The general design of the engine is a vertical steeple compound, driving the pumps through a walking-beam, motion being imparted to the crank and flywheel by means of a connecting-rod extending from the lower side of the beam to the crank-pin. The high-pressure cylinder is 50 inches in diameter, and the low-pressure cylinder 100 inches in diameter, and the stroke is ten feet. Thus the ratio of the cylinders is one to four.

Both cylinders are fitted with double-beat poppet valves, the high-pressure valves being operated by trip cut-off gear, and the low-pressure valves by toes and lifters using Stevens' cut-off. The engine is designed to work with 125 pounds pressure, and at speeds varying from five to ten revolutions per minute. At ten revolutions the capacity is 3200 gallons of water per minute from a depth of 1500 feet. An independent steam-power or air pump is employed. The surface condenser uses part of the water pumped from the mine for condensing purposes. Steam is supplied by vertical tubular boilers of the Reynolds type.

A peculiar feature of the engine is that the cylinders and valve gear are so proportioned and arranged that the engine can be run by compressed air instead of steam if desired. The air will be supplied by the company's compressed-air plant, at Quinnesec Falls. This plant is run by water power.

Perhaps the best idea of the great size of the engine is obtained by observing the dimensions of some of the details. The total height above the engine-room floor is 54 feet, and the total weight of the machine, exclusive of the pumps, is 600 tons. The flywheel is 40 feet in diameter and weighs 160 tons, and the walking-beam is 32 feet c. to c., and weighs complete 100 tons. The connecting-rod is 30 feet c. to c., and 15 inches in diameter. The journals of the main shaft and of the beam centers are 24 inches in diameter and three feet long. The crank-pin, crosshead-pin and the pins of the beam have bearings 16 inches in diameter and 18 inches long.

As already stated, the final depth of the shaft will be 1500 feet, but at present it is only about 600 feet deep, and only three sets of pumps are now in place. The first is about 200 feet below the surface, and the others are below this and about 193 feet apart. All three pumps are operated by a steel pump-rod seven inches in diameter, running in adjustable bracket guides, 22 feet apart, attached to the timbering of the shaft. The pump-rod is operated from the outer end of the walking-beam through a connecting-rod 23 feet long, to which the pump-rod is joined by a crosshead running in cast-iron guides. The general design of this crosshead is exactly the same as that of the pump crosshead. The pump-rod is made up in sections 22 feet long, which are connected by a cast-steel clamp coupling.

The pumps are of the ordinary "Cornish" single-acting outside packed plunger type, and each is fitted with a single-suction and a single-delivery valve. The plungers are 28 inches in diameter and have a 10-foot stroke. The valves are of the double-beat "Cornish" type. The valves have two passages for water, one of 263 square inches and the other of 340 square inches area, making the total area of the water passage 603 square inches. The lifting area is 222 sugare inches and the lifting pressure 1.52 pounds per square inch. The weight of the valve in water is 340 pounds. It is interesting to note at this point that, while the general tendency in this country in designing pumping engines is toward the use of a number of small valves instead of one large valve in water ends, designers of such high reputation as Mr. Reynolds and his staff preferred in this case to use a single large valve.

Each pump stands in a wrought-iron tank, or "sump," and each discharges through a 28-inch rising main into the tank of the pump above. The pumps are supported on wrought-iron columns, which in turn rest on heavy 30-inch girders built into the shaft. The weight carried by these girders, including the thrust of the pumps, is about 100 tons for each set of pumps. The wrought-iron columns are made adjustable for a sufficient height to permit keeping the pumps in line in case the girders settle.

The weight of the pump plungers, rods and connections is calculated to do half of the work on the down stroke, the remainder of the power necessary being supplied by the engine. On the up stroke the engines have, of course, to do an equal amount of work in lifting the dead weight of these various parts. In order to get the proper balance to secure this result, a balance bob is placed at a point about 50 feet above the present lower set of pumps, *i. e.*, about 550 feet from the surface. The arm of this balance is 24 feet long and is attached to the pump rod at one end and carries at the other end a counterweight of 35,000 pounds. The connection with the pump rod is made by two links which attach to a crosshead clamped to the rod.

Decision in a Mining Case.

Judge Prewett, of the Superior Court of Placer county, has just rendered a decision of importance in the case of Van Vacter, plaintiff, versus Booth *et al*, defendants. The full text is as follows:

The mining claim claimed by the plaintiff was located in 1881. Neither she nor her predecessors in interest have ever performed any labor thereon, but the claim has been leased from year to year to some Chinese, who have annually, since 1883, performed at least $100 worth of labor, except possibly during the year 1892.

An unusual number of very important questions involving mining law have arisen during the progress of this case, but the decision of the case really turns upon the sufficiency of the marking of the claim on the ground to constitute a valid location.

The evidence is clear that two stakes were set at the two upper corners of the claim, but equivocal and doubtful as to whether the locators placed any stakes at the lower end.

The claim is of the class known as a "river claim," and purports to extend along the bottom of the American river canyon a distance of 3000 feet, and to extend 150 feet on each side of the center of the river.

The evidence shows that the sides of the canyon are steep, uneven, precipitous and brushy, and that the river has a number of turns in its course through the claim.

Assuming that all four of the stakes were properly set, we have then this naked question: Will four stakes set as above described, two on each side of the river and more than one-half a mile apart, mark a claim so that its boundaries may be readily traced by a stranger who honestly sought information as to whether the land was located or not?

The whole object and purpose of marking the boundaries is to place on the ground such physical monuments as will indicate to the eye the fact that the claim is appropriated and the exterior limits of the appropriation.

The solution of this question cannot be made to depend in any degree upon any posted notice or the record thereof, because no evidence was offered by either party to show any mining rule of the district which requires either the posting or recordation of a notice.

In the absence of such evidence the Supreme Court has held that the Superior Court cannot take judicial notice of the existence of such a local rule, if in fact it exists. 73 Cal., 109.

"A location notice is only a temporary expedient until the other necessary acts of location are completed." 83 Cal., 131.

"A location notice is unnecessary unless required by the local rules of the district." 83 Cal., 188.

"Neither is it necessary to record it unless required by the local rules." 72 Cal., 533; 78 Cal., 544; 83 Cal., 188; 83 Cal., 296.

The one requirement, however, that is indispensable and essential in all cases to make the location valid is that the claim must be distinctly marked on the ground, so that its bounndaries may be readily traced. 53 Cal., 150; 17 P. R., 728 and 547; 89 Cal., 310; 83 Cal., 296 and 187; 88 Cal., 131; 33 P. R., 677; 78 Cal., 595 and 546; 65 Cal., 420 and 555; 59 Cal., 612; 53 Cal., 217; 67 Cal., 656 and 111; 70 Cal., 226; 73 Cal., 109; 55 Cal., 261; 130 U. S., 291, and many others.

The plaintiff caused her notice of location to be recorded, and there is some evidence which shows that it may possibly have been posted, but its recitals are evidence of nothing; first, because it does not appear to have been required by any local rules (83 Cal., 298, and 38 P. R., 677), and secondly, it would be at best only *prima facie* evidence of the matters required by the U. S. mining laws to be stated in it, and the fact that the boundaries are marked is not one.—20 P. R., 807; 11 Colo., 380; 8 Mont., 168, 242, 248 and 298.

Can it be said that these four stakes, 300 feet apart one way and 3000 the other, and in a timbered, uneven canyon, mark the claim so that its boundaries can be readily traced? I think not.

The very object, and I may add the only object, of the stakes is to point out the claim so that its boundaries may be readily traced.

If they do this, then four are sufficient, and the location is valid; if they fail to do this, then to make the location valid would require such increase in the number of stakes as would readily mark the boundaries.

The opinion is widespread, but as erroneous as widespread, that it is always sufficient to place a stake at each corner of the claim.

This, in some cases, is undoubtedly sufficient; but the true, final and only test is, "Can the boundaries be readily traced?" It is obvious that in the application of this simple rule some places will require more stakes than others. It is impossible to establish any number that will apply to

all cases. Each case must be determined according to the character of the ground and the reasonable necessity for a greater or less number of stakes.

The Supreme Court has stated the rule correctly in the following extract:

The Superior Court instructed the jury "that a monument of stone two feet high placed in the center of the location, with a notice of location placed thereon, and a similar monument of stone or a stake at the center of each end of the location and at each corner are a sufficient marking on the ground to constitute a valid location of a mining claim." That depends on the condition of the ground to be located. If the conformation is such that monuments and stakes of the description given would so mark the boundaries as that they could be readily traced they would be sufficient. Otherwise not; but that was a question for the jury.—67 Cal., 656.

In the case just quoted it is seen that the Supreme Court refused to declare that even seven stakes were sufficient as a matter of law to constitute a valid location.

On a treeless, level plain doubtless a stake at each corner would be sufficient, but in a rough, uneven, brushy country it certainly would not.

"If recording is not required (by the local rules) it is useless and left out of account."—83 Cal., 298.

I find it unnecessary to determine the constitutionality or force of the statute of 1891 (p. 219) requiring affidavits of annual work to be filed with the County Recorder. It is at best a very crude statute, but is probably operative for some purposes.

Let the defendants prepare findings, and thereon let judgment be entered in favor of defendants, with costs.

PREWETT, Judge.

American Mining Machinery.

If there is one department of industry in which the craftsmen of the New World especially excel, it is in the manufacture of machinery for mining purposes, says *Money and Trade* (London). In this respect they have distanced all competitors, including those of Great Britain and central Europe, their chief strength lying in the construction of novel and time-saving appliances. As regards workmanship, it is probable that our own manufacturers in the Midlands and in the North can more than hold their own; but in these days quality is not the only merit required. Admit, for sake of argument, that an English machine costing £1000 may last ten years, as against six years in the case of some Transatlantic product; nevertheless the latter may be the cheaper article by far. The true test of cheapness is the volume of work performed. Comparative durability is of little consequence if the American machinery saves in time and wages; in other words, does more work in a given time or at a given cost. Our fault is lack of inventiveness. Outside of coal and iron-mining machinery, we are miserably behind the Americans in this essential, probably because we have no gold and silver mines worth mentioning at our doors. There is no reason, all the same, why the miners in South Africa and in Central and South America should be compelled to look New York-wise for their requirements. They are doing so, unfortunately, to a very large extent, and their choice of American plant is justified. Whatever its quality, it wins quartz cheaply, and, although labor is dear in the States, the cost of production in some of the American gold mines has been reduced to about 5s. a ton. Inventiveness is the secret.

For the Midwinter Fair.

We give on this page a picture of the Administration Building of the Midwinter Exposition, reproduced from the *Illustrated Pacific States*. This building was designed by A. Page Brown. It is the smallest of the five main buildings of the fair, but is intended to be the most attractive in style and ornamentation. Its design is oriental, with additions. It consists of a central square structure covered by a lofty dome, and has four pavilions, one on each corner of the square. All sides will be of equal dignity and finish, and the building will be, both in its style and its functions, the natural center of the midwinter plant. It will have considerable height and will be a striking object, as it is intended to be. In it all the executive offices of the fair will be situated.

ADMINISTRATION BUILDING AT THE MIDWINTER EXPOSITION.

HIGH-GRADE ORE having been uncovered in the Rawhide mine, Tuolumne county, the *Union Democrat* declares that similar results may be obtained in the Rappahannock, Isabella and Gem, Alabama, Tarantula and other mines in that vicinity all in the mother lode. Practical tests of the ores from these mines give the most gratifying results, and prove conclusively that they are properties of value.

Scientific Progress.

Size of the Sea.

One gallon of water weighs ten pounds, so the number of gallons in the Pacific is over 200,000,000,000,000 — an amount which would take more than a million years to pass over the falls of Niagara. Yet, put into a sphere, the whole of the Pacific would measure only 726 miles across, says an English exchange.

The Atlantic could be contained bodily in the Pacific nearly three times. The number of cubic feet is 117, followed by 17 ciphers —a number that would be ticked by 1,000,000 clocks in 370,000,000 years. Its weight is 325,000,000,000,000 tons, and the number of gallons in it 73,000,000,000,000.

A sphere to hold the Atlantic would have to be 533½ miles in diameter. If it were made to fill a circular pipe reaching from the earth to the sun—a distance of 93,000,000 miles—the diameter of the pipe would be 1837 yards, or rather over a mile; while a pipe of similar length to contain the Pacific would be over 1¾ miles across.

Yet the distance to the sun is so great that, as has been pointed out, if a child were born with an arm long enough to reach to the sun, it would not live long enough to know that it had touched it, for sensation passes along our nerves at the rate of 100 feet a second, and to travel from the sun to the earth at that rate would take a century and a half, and such an abnormal infant is an unlikely centenarian.

The rest of the sea includes the Indian ocean, the Arctic and Antarctic seas, and various smaller masses of water; it covers an area of 42,000,000 square miles, and would form a circle of 7300 miles in diameter.

The average depth may be put at 2000 fathoms (12,000 feet), and the contents at 95,000,000 cubic miles. It weighs 390,000,000,000,000 tons, and contains 87,500,000,000,000 gallons; while it would form a column reaching to the sun of 2000 yards in diameter.

If we now combine into one vast whole these figures, we arrive at some stupendous results in answer to the question, "How big is the sea?"

Its area of 140,000,000 square miles could be confined by a circle 13,330 miles across. The relative size of the areas of the whole surface of the earth, of the whole sea, the Pacific and the Atlantic, are represented by circles, the diameters of which are in the proportions to one another of 158, 133, 93 and 62 respectively; or by a crown for the surface of the earth, a half-crown for the surface of the whole sea, a shilling for the surface of the Pacific, a three-penny piece for the surface of the Atlantic.

Supposing the sea to be formed into a round column reaching to the sun, the diameter of the column would be nearly 2½ miles. The Pacific would form 53,000,000 miles of its total length of 93,000,000, and the Atlantic 18,000,000.

If it were a column of ice, and the entire heat of the sun could be concentrated upon it, it would be all melted in one second, and converted into steam in eight seconds, which illustrates the heat of the sun rather than the size of the sea.

Phosphorescent Minerals.

Mr. Jacksh, of Trieste, Moravia, as quoted by the *Popular Science Monthly*, names four snlphurets which becomes phosphorescent after a brief exposure to daylight—the sulphurets of calcium, strontium, barium and zinc. The last compound has been obtained in a luminous condition only recently by distillation in a vacuum. Prepared in the usual way, by precipitating soluble salts of zinc with sulphurets, it shows no signs of phosphorescence. Sulphnret of barium gives a yellowish orange glow, but only for a few minutes after each exposure to the light, and is of as little use as the sulphurets of strontium and of zinc, the greenish glow of which disappears after about two hours. For practical uses the sulphuret of calcium of commerce is the only phosphorescent of value. Pure, it gives a faint yellowish light, but treated at a red heat, with the addition of a small quantity of a salt of bismuth, it is transformed into a substance giving a violet light and retaining its luminous quality for nearly 40 hours after an exposure of only a few seconds.

Salt from Reclaimed Sea Lands.

Dr. C. V. Riley, of the Department of Agriculture, to whom the *Scientific American* referred a request to know how to get rid of salt in land reclaimed from the sea, writes as follows:

I received a note from you requesting an answer to a questlon asked by one of your subscribers, as to what process should be used to get rid of the salt in land that has been reclaimed from the sea and dried, and what plants can be set therein to the greatest advantage. The question cannot be intelligently answered without more detailed information as to the nature of the soil and the latitude. If the land is sandy, there is no better way than by leaching through irrigation, and the natural rains ln time will do this, if there is good drainage. If the soil is tenacious, it will, however, be very difficult to get rid of the salt. The plants which would be recommended for a northern latitude would be different from those which might succeed in a more southern climate. There are certain grasses which thrive in salt lands, especlally sandy lands; for example, the so-called black grasses, which make fairly good hay and are used for various other purposes. These are *Spartina juncea* and *Juncus gerardi*. Another grass which thrives in sandy soils and helps to prevent the sand from drifting is *Ammophila arundinacea*.

These will all grow in northern latitudes, and the salt marsh grasses, when they once get a good foothold, will thrive in such soil. The barberries and the species of euonymus, especially *Euonymus japonica*, are known to thrive in salty lands. Of cultivated crops, the experience of the Mormons in Utah, near the Great Salt Lake, would indicate that beets, followed by potatoes, are among the most profitable crops in saline lands. It is questionable whether much salt long remains to be of any injury to ordinary plants in reclaimed lands that are not periodically overflowed again by salt water.

Life in Paris Water Mains.

In a pamphlet issued, M. Arnould Locard discusses the peculiar fauna of the Paris water mains, which it appears are infested by numerons mollusks, which appear to thrive well in their environment. The largest of these mollusks are the *Dreissentia Arnouldi*, which attain sizes up to 1½ inches and are comparatively more numerous in the water mains than in the River Seine. They fasten themselves firmly to the sides of the mains, and form a great obstruction to the passage of the water. So firmly do they adhere that very powerful scrapers are required to move them. As for remedy, M. Locard suggests that the mains should be laid dry for a few days, when the mollusks would die, and might then be removed, and the main thoroughly washed out before being again used for conveying potable water. To prevent their re-introduction, the water supply should invariably be filtered before passing into the mains.

The Age of Aluminum.

Science will yet achieve, says a Pittsburg writer, the reduction of aluminum to a cost which will substitute this wonderful metal in place of steel, silver, iron, copper and what not? Science is at work on thls, and if successful, its fabulous results will accomplish for the next century what steam and electricity have done for this. With its inexhaustible deposits the solution of the question of its cheap production will, in a few years, give us aluminum vessels, houses, railroad cars, street cars and heaven knows what not. It is only a question of time before the inauguration of the aluminum age, and when it comes the world will have made the same stride in progressive science that it did when it harnessed steam and buckled the belt of electricity around the globe to do the work of the world and measure itself to the use of man.

A Cunning Toad.

A scientific journal tells this story of a toad's cunning: A brood of chickens was fed with moistened meal in saucers, and when the dough soured a little it attracted large numbers of flies. An observant toad had evidently noticed thls, and every day toward evening he would make his appearance in the yard, hop to a saucer, climb in, and roll over and over until he was covered with meal, having done which he awalted developments. The flies, enticed by the smell, soon swarmed around the scheming batrachian, and whenever one passed within two inches or so of his nose, his tongue darted out and the fly disappeared. The plan worked so well that the toad made a regular business of it.

Oil in Water.

An interesting account is in circulation of how Prof. Oberbeck of Greifswald went to sea on a boat, armed with bottles of oil containing measnred quantities, which he poured upon the wake in a thin continuous stream. Afterward, on revisiting his tracks, he found the oil had spread out into broad, rectangular patches, the area (and it is supposed to be inferred the thickness) of which he calculated with the aid of an intelligent and experienced mariner. It is reported that one litre of oil had spread itself out into a film about fifty-three millionths of a millimetre in thickness, and covering an area of 18,000 square metres or more.

Mechanical Progress.

The Harvey Process.

Mr. Hayward A. Harvey, the inventor of the method which bears his name, shortly before his death took out a patent dealing with improvements on it, says the *American Machinist*. Hitherto powdered charcoal has been employed as the material for snpercarburizing steel for armorplate. Several objections have, however, been experienced in its employment. These difficnlties are referred to as follows: It has been found necessary to deeply imbed in the powdered charcoal the metal to be treated, because of the tendency of masses of powdered charcoal to subsidence when heated. This has involved the employment of treating chambers of undesirably large vertical dimensions and corresponding increase in the height of the furnace chambers. Another difficulty has risen from the tendency of the finely powdered charcoal to fly off in dust stirred or moved from place to place, as it has to be when loading and unloading the treating chamber. It is also the fact that for some reason, the nature of which is not fully understood, when fine wood charcoal alone is used and is subjected to high heat, explosions occasionally occur. These explosions are forcible enough to blow off the cover of a closed receptacle, or if the receptacle containing the fine charcoal is not closed and the charcoal is covered with a layer of sand and a superposed layer of firebrick, a species of ebullition is observed to take place in the granular mass by which the mass is loosened so as to diminish the firmness of its compression against the steel which is to be snpercarburized. Mr. Harvey claimed to have overcome these difficulties by forming the carbonaceous-treating bed partly of finely powdered wood charcoal and partly of animal charcoal, using for that pnrpose the "spent char" from sugar refineries. The statement was made that 10 to 15 per cent causes an observable diminution in the quantity of dust arising, and that 40 to 50 per cent almost entirely prevents the escape of dnst.

What the Ferris Wheel Teaches.

In answer to the question of what the Ferris wheel represents in mechanics, Mr. Ferris recently said:

"I suppose you might consider it as typifying the present progress, the latest development of mechanical engineering. You know there are really two wheels—one bnilt 30 feet within the other. These are joined by truss-work, such as is used in our finest bridge construction. Beyond all that, the wheel develops to a degree hitherto never realized the capacities of a tension spoke. You know that the wheel is not only a perfect pinion wheel, but a tension wheel as well, and these, I suppose, may be regarded as its chief points. It is as perfect a pinion wheel as the little wheel that goes flicking back and forth in your watch. In all that immense diameter there is less deflection proportionately from a true circle than from the pinion wheel of the most perfect watch made. This is due to the fact that it has, instead of stiff spokes, the tension or jointed spokes. When I first proposed to build a tension wheel of this diameter, the feat was regarded as impossible. It was held that the spoke rods on the upper side of the wheel at any given moment, instead of snstaining the weight of the upper part of the wheel, would, from their own weight as they hung vertically, pull down that arc of the wheel which they bore upon, and thns cause the wheel to become elliptic. As a matter of fact, they do nothing of the kind. There is absolutely no deflection from the perfect circle."

Wire Shafts for Steamships.

Experiments have been made with the new plan of wire shafts for steamships, says the *Manufacturers' Gazette*, the result showing that when the shaft is in position and rotating stress is applied, a tensile force is exerted upon the individual wires and their several fastenings—each a unit of strength snstaining its part of the total amount of stress. The strength of the individual wires and of the fastening being known, it is practicable to ascertain the strength of the shaft as a whole.

Thns, if made for instance in five sections, its total length 100 feet and its diameter 15 inches, the shaft will have 25,000 No. 7 steel wires, each 25 feet long, with their 50,000 fastenings; each wire and each fastening will sustain a load of 500 pounds without rupture or injury, making a total inherent strength of 37,500,000 pounds, or 25 times greater in amount than the continuous force of an engine of 5000-horse power. A stress of 25 pounds only upon each unit of strength—each point of resistance existing in a wire shaft as named—will more than equal the force of such an engine.

Bottle-Blowing by Machinery.

The Ashley bottle-making machine at Woodbnry, New Jersey, appears to be a success. It had been claimed for the machine that bottles had been made quite complete, which had successfully been subjected to an internal pressure of 300 pounds to the square inch. The trial run at Woodbury has been very successful. The automatic principle has not been developed to the full extent in these machines, bnt it has been carried so far that one man and three boys —none of them necessarily skilled glass-blowers—can operate two machines, each of which is capable of turning out two bot-

tles a minute. The machine does not gather the glass. One of the boys, the "gatherer," is specially detailed for that service. He feeds the molten "metal" to the machine, in which it is mechanically molded, the neck and month formed, the interior blown by means of compressed air, and the finished bottle automatically delivered to a carrier which takes it to the annealing oven. There is unbounded room for improvement both in the performance and capacity of the machines. But the important step has been taken, and bottles have really been made in this country by machinery.

1200-Horse Power Turbine for Niagara.

Another immense water-wheel has just been shipped to Niagara Falls by James Leffel & Co., of Springfield, Ohio. It is a duplicate of and nearly the same power as one which was shipped some six months ago to the Cliff Paper Co., and is intended for the same parties.

The wheel is of the new type on horizontal shaft, and is known as the James Leffel double-discharge turbine, the entire weight being 30 tons. The water will be conducted to the wheel from a canal near the top of the cliff by an 8-foot pipe, extending downward until it reaches the mill, located near the foot of the cliff. The water will enter the cylinder casing of the wheel from below, passing upward a few feet, filling the case, and thus obtaining the head pressure.

The amount of head will be about 130 feet; the wheel being some 67 inches in diameter, a speed of 225 revolutions will be obtained, and almost or quite 1200-horse power developed. The runner is made bronze, with a very strong, heavy iron center, all nicely proportioned and designed, and the mechanical construction finely executed. The wheel will connect direct to the powerful wood-grinding machinery, obviating entirely the use of the gear or belts. The machines will be located on each side of the wheel, affording a very simple design and arrangement for the whole plant.

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The water-wheel company have just completed a very original and unique design of water plant for another New York company. It comprises four wheels in one system, being a quadruple wheel of 1000-horse power, to operate under a 40-foot head. Equally as successful results are contemplated for this combination of wheels as they are realizing from their Niagara water-wheel plants.

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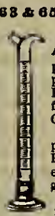

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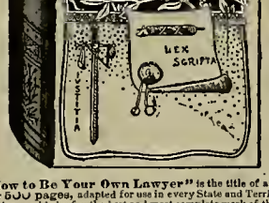

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Useful Information.

Steel and Iron.

Here are the statistics, presented at a recent meeting of the British Iron Trade Association, of the relative increase of the iron production of the chief manufacturing nations within 15 years:

	Production of pig iron in the years	
	1887.	1892.
Country.	Tons.	Tons.
United States	2,066,000	9,157,000
Great Britain	6,608,000	6,616,000
Germany	1,614,000	4,793,000
France	1,453,000	2,023,000
Belgium	490,000	768,000
Austria-Hungary	400,000	935,000
Russia	450,000	915,000
Spain	43,000	179,000
Italy	24,000	12,000
Sweden	351,000	491,000
Other countries	60,000	90,000
Totals	13,559,000	25,979,000

While the world's production of pig iron increased in this period 91.6 per cent, Great Britain's production only very little more than held its own. In 1877 Great Britain contributed 48.9 per cent of the world's production of pig iron, and the United States only 15.3 per cent. In 1892 the relative position of the two countries is reversed, England contributing only 25.4 per cent, against 35.2 per cent for America. But, significant as these figures are, Great Britain's declining importance as a steel producer, as contrasted with her protectionist rivals, is even more illuminating. Here are the statistics for the production of Bessemer steel, covering nearly the same period:

	Production of Bessemer steel in	
	1878.	1892.
Country.	Tons.	Tons.
United States	584,000	4,168,000
Great Britain	762,000	1,501,000
Germany	390,000	*1,900,000
France	218,000	510,000
Belgium	75,000	*210,000
Austria-Hungary	97,000	*220,000
Russia	8,000	95,000
Sweden	22,000	*191,000
Spain	.....	130,000
Totals	2,106,000	9,825,000

*In these countries the quantities are only approximate, inasmuch as Bessemer steel ingots are not distinguished from finished Bessemer steel or finished Siemens steel.

In 1878 Great Britain was contributing 42 per cent, nearly half of the world's steel production, and the United States only 25 per cent. In 1892 it was the United States which was producing 42 per cent, and the United Kingdom only 15 per cent, or actually less than Germany. According to the English statistician, while the Bessemer steel production of Great Britain increased 97 per cent from 1878 to 1892, that of France had increased 134 per cent, that of Germany 387 per cent, that of the United States 680 per cent.

Over Three Million in One Day.

The transportation lines in the city of Chicago carried probably over 3,000,000 passengers on "Chicago Day," Oct. 9. The following figures are given by the *Tribune* for the most important transportation lines:

South side cable system	757,660
North and west side cable lines	765,641
Illinois Central	738,329
Alley Elevated	294,986

This makes a total of 2,556,416; and the traffic on the horse and electric lines in various parts of the city, with the travel on the various lines of steam railway which can be properly classed as city traffic, must have made the total number of passengers carried considerably over the three million mark.

Artificial India Rubber.

Artificial india rubber from cotton-seed oil is one of the latest industrial products, and claimed to possess commercial adaptations of peculiar practical value, says the *Tradesman*. The manufacture involves a process not yet given out to the public by the discoverer, who states that, while experimenting with the cotton-seed oil to produce a varnish for painting, he obtained a substance entirely foreign in its make up and properties to what was sought—not a varnish, but rubber. So simple is the process, as alleged, that it is not within the protection of a patent—the only safeguard being, therefore, in the secrecy of the process, by the use of which, it is asserted, only 15 per cent is required of the genuine rubber to produce an article which can in no way be distinguished from the ordinary crude india rubber, it is said, even by experts in the handling of the latter article. Arrangements have been made for its extensive manufacture and its application to the various purposes so long peculiar to the natural material.

Cost of Great Britain's Defenses.

The British empire spends as a rule upon defense from $250,000,000 to $280,000,000 a year, of which the military expenditure of India, with the indirect expenditure for the sake of India on mobile land forces at home, forms the largest item. Almost the whole of this vast sum is expended out of British loans or taxes under the control of the Parliament of the United Kingdom, and out of Indian taxes under the indirect control of the House of Commons through the Secretary of State, who is a member of the government of the day. The expenditure, although vast—although open to the reproach that it does not do more than maintain a fleet slightly superior to that of France, and an army of very small numbers—is a flea-bite as compared (in its ill effect upon the wealth of the nation) with the military expenditure of Italy, or, in a less degree, with that of other continental powers. The evidences of the overpressure of taxation in India itself, many as they are, are slight in comparison with those which are present in the case of Italy; and it may be assumed, therefore, that while the taxpayers of the United Kingdom and of India may make their voices heard in insisting upon better value for their money, the expenditure will not in itself be brought to an end by bankruptcy.—North American Review.

Interested in Beards.

Captain H. Bower, of the Seventeenth Bengal Cavalry, is one of the most recent travelers in that secluded country of Thibet, which, in all its barrenness, is gradually being made known to the West by the explorations of modern travelers. From an account which the gallant captain gave of his experiences in the country, at the Royal Geographical Society lately, it would seem that if ever Thibet should be opened up to trade, remedies for promoting the growth of the beard are likely to find a good sale there, for, according to Captain Bower, "anything like a decent beard is almost unknown in Thibet, and the natives expressed great admiration for the beards of the travelers, and wanted to know if they could supply them with any medicine that would make theirs grow."—American Druggist.

An Engineer's Smart Scheme.

An interesting story is sent to us telling how Mr. George Westinghouse, the millionaire inventor, obtained $1,000,000 when he needed it badly. When the Westinghouse Air Brake Company was a new concern, the directors gave to Mr. Westinghouse a paper vesting absolutely in his hands the power to fix the selling price of air brakes. The object was to cripple competitors. When the Westinghouse Electric and Manufacturing Company was in trouble, Mr. Westinghouse applied to the Air Brake Company for a loan of $500,000. His application was refused, and mention made of the fact that he owed the Air Brake Company $650,000. At the next meeting of the Board, Mr. Westinghouse produced the paper giving him the authority to fix prices. Its existence had been forgotten, and the directors saw the importance of gaining possession of it. Attorneys were consulted to ascertain what could be done. All said that the only thing would be to make terms with Mr. Westinghouse. Then he was asked what he would take for the paper. He said $1,000,000, stuck to the figure, and got it. The directors who refused the loan of $500,000, and then paid over $1,000,000, don't like this story, but its truth is vouched for.

Electricity.

Accumulator from Lead Dust.

An interesting circular has been issued by the Electricity Company of Gelnhausen (near Hanau, in Germany) announcing that they are now manufacturing a new accumulator, independent of existing patent rights, in which the active paste consists of the finest lead dust. This lead dust has been used with the best results as active material in the Khotinsky batteries, the patents for which are owned by the Gelnhausen Company. These negative electrodes require no formation. The exclusive employment of this lead dust for the positive electrodes as well, in the first instance presented the serious obstacle that metallic lead, even in the form of lead dust, on being oxidized to lead peroxide by the action of the electric current in presence of dilute sulphuric acid, expands in volume to such an extent that the pressure on the walls of the leaden electrode carrier causes the active material to fall out, and thus renders the accumulator useless. This obstacle has been completely removed in the following way:

The lead dust is mixed with substances which remain entirely neutral in the action of the accumulator, while, on the other hand, they are of porous structure, and yielding to such a degree that they afford the necessary space for the expansion of volume of the lead dust on its being changed into peroxide, so that a deleterious pressure is no longer exercised on the walls of the electrode carrier. At the same time the active mass in the accumulator is, as it were, firmly cemented together, and its failing out thereby prevented. The lead dust is now used as active material both for the positive and negative electrodes, while as electrode carrier a framework of compressed lead is employed which has given most satisfactory results, and is protected by a German patent. In this way, so the Gelnhausen Company claim, an entirely new accumulator has been obtained where both electrodes are made of metallic lead dust obtained by a process which is likewise protected by patent. This accumulator, therefore, claims to infringe none of the existing patents. The negative electrode of the new accumulator, as already mentioned, requires no formation whatever, while in the negative electrode the oxidation of the metallic lead dust to lead peroxide, in consequence of the much higher conductivity of metallic lead against that of lead salts, is accomplished most readily and most rapidly. The extreme porosity of both electrodes favors in a striking degree the thorough utilization of the active mass, as compared with those accumulators whose electrodes are filled with oxides of lead. At equal capacity the new lead-dust accumulator is stated to be of much lighter weight than those made of lead oxides, and its capacity per kilogram of electrode is higher than that of the latter. The chemical and physical properties of the new accumulator ensure it a longer life than that of accumulators made of lead oxides, while at the same time the cost of manufacturing, and consequently also the selling price, is cheaper.

Underground Electric Conduits.

In a paper read before the International Electrical Congress, Chicago, Prof. D. C. Jackson stated that four different varieties of underground electric conduits were at present in use in this country. These were cast of wrought-iron pipe, cement-lined sheet-iron pipe, tile, terra-cotta, or clay pipes, and wooden tubes. Of these, glazed terra-cotta was the most used, the sections being three feet long, and the ducts rectangular, and each capable of containing at least three cables. It was watertight and nearly gastight, and the glaze has a high electrical resistance. When laid in concrete the conduit should be laid with its top two feet below the pavement; without concrete at about three feet. The tile conduit was laid on a bed of cement from two to six inches thick. It was covered with concrete to a similar depth, so that when the whole had hardened it resembled a continuous set of stone ducts. Joints between the sections were made either by burlap strings soaked in asphalt, or more commonly by a tile sleeve cemented on. The simplest conduit used was wrought-iron gas pipe laid either bare in the ground or imbedded in concrete. The ducts were usually two or three inches diameter, the latter size accommodating four cables. The joints are made with screwed sleeves, and the pipes are usually 20 feet long. Experience shows that cables can be pulled easily round curves in these pipes of not less than three feet radius. When laid in concrete, the pipes are spaced about 1½ inches apart. When alternating currents are used, the out and return cables should lie in the same conduits to avoid losses by eddy currents and hysteresis in the pipe. Wood conduits were largely used in Philadelphia. The walls were about 1¼ inches thick, and the top was covered with two-inch plank as an additional precaution. The commonest kind was built of 4x4-inch pieces of wood with a three-inch hole bored through them. The wood was preserved with coal tar oil (carbolineum). The disadvantage of this system was the destruction of the covering of the cables by the preservatives used for the wood. The only type of conduit used on a large scale was the cement-lined iron pipe.

French Electric Locomotive.

Trials of the Heilmann electric locomotive have recently been made at Havre with, it is stated, satisfactory results, at least in so far as the ease and smoothness of running are concerned. This locomotive, says *Engineering*, consists in the principle of a steam engine driving a dynamo which supplies current to motors which finally effect the propulsion. The engine was tried on a stretch of line about 1¼ miles long, which contained curves of 250 feet radius and stiff slopes. The shortness of the run prevented any high speed being attained, but at speeds of from 20 to 25 miles an hour the running of the locomotive was remarkable. In shop trials the machinery has been run at a speed corresponding to 68 miles per hour. Trials of the combined efficiency of the engine dynamo and motors were made on the return of the locomotive to the shops, but the results of these have not yet been published.

Fast Time on Electric Road.

There is a likelihood that a high-speed electric railroad will be built between Brussels and Antwerp in time for the Belgian Exposition. The daily traffic requires 16 express trains each way on the present steam roads. The route is direct and practically level. It is proposed to run a single electric car, holding 60 people, every 10 minutes, and making the trip in 20 minutes, at a speed of about 66 miles per hour. This speed, it is claimed, could be safely doubled later on, but it is contemplated to begin with a more moderate speed, and to increase it later. The cost of the road is estimated at about $2,200,000.

The Telephone in Warfare.

Experiments were recently made abroad with a bimetallic wire, made up of a core of steel surrounded by a coating of copper, to show the practicability of use of the tele-

phooe in time of war. Reels carrying 10,000 feet of this wire can be easily carried by soldiers as a part of their equipments. The eotire apparatus necessary for a lioe one mile loog can, by the ose of this wire, be made to weigh ooly 5½ ponods. The wire is onwouod naked on the ground, the retnrn grouod circult beiog made throogh the operator or his horse in case he is mounted. Io actual trials made a short time ago, a line 14 miles long was laid in five honrs and taken up in one hour.

Electricity and Vital Energy.

H. Newman Lawrence draws the follow·ing conclnsions concernlog electrical aod chemical fuoctloos in association with hnman vitality: 1. All the thousand and ooe chaoges which take place in the struc·ture of the liviog body, he they due to the oever-ceasing and involuntary process of metabolism or to the exercise of function, or to the effort of will, partake of the nature of chemical chaoge. 2. All chemical changes are accompaoied hy electrical manifesta·tions. 3. Without chemical change and in·terchange life does not appear to exist. 4. Therefore, life is always accompaoled hy the generation of electricity. 5. Electrical eoergy, however, is not the immediate source of the vitallty of the body.

Heating Iron Rods for Nails.

The scope of electric heating apparatus is very wide in Norway. A furnace for the equal heating of the iron rods for the maou·facture of horseshoe nalls was required by the Norweglan trade, and Alexander Sie·mens, who stands among the first Enropean electrlcians, was commissioned to construct such a furnace. When completed it con·sisted of a hnge core of carbon, rendered in·candesceot by the passage of a large cnrreot at low voltage. The core was imbedded in sand to prevent escape of heat, and was itself hollow. An lron rod passed slowly through, and at once became red hot, the speed of pulling throngh regulating the heat.

Electricity in a Brickyard.

A progressive brick manufacturer in Anburo, Me., has arranged an electric motor to do the work of horses ln grindlng. In all yards where horses are used it ls an established fact that one of the greatest troubles experienced in the windlass and treadmill is the rapld decline of the horses, as the strain upon thelr shoulders is so great that they succnmb in a very short time. Other New Eogland manufacturers are adopting the use of electricity ln their plants, aod wlth such excellent results as to promise the opinion that lt wlll soon become uni·versal.

Making Things Talk.

A curious discovery ln science was lately reported in the *Electrical Review*. If a beam of sunlight be passed through a prism so as to break it up into rainhow tiots, and these be allowed to fall, one at a time, upon a glass vessel containing lampblack, colored slik or worsted, the vessel will give forth souods varying according to the fabric em·ployed and the color of the ray which strikes it. Every klod of material gives forth some souod to some color and ls silent to others.

Singular Combination.

A receot number of *Cosmos* describes a singnlar combination of reflectors for an electric lamp. A large parabolic reflector at the back projects the back rays of an electric lamp. In the front are four or five portions of parabolic reflectors in annular rings. The result is said to be surprising, and the inventor indicates this as a useful arrangement for colliery, tramway or other similar lamps. Sections and views are given of this oew lamp, which is the invention of G. Bellati, a colonel in the Italian army.

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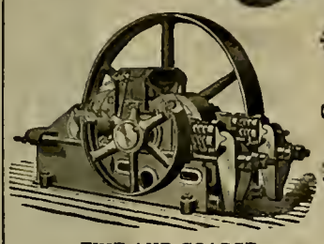

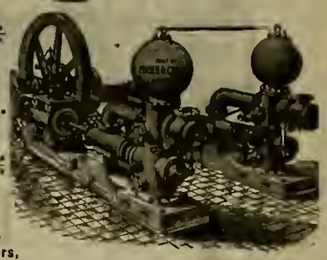

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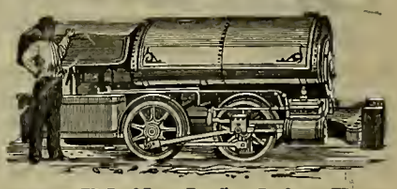

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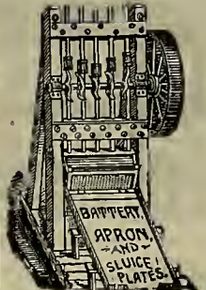

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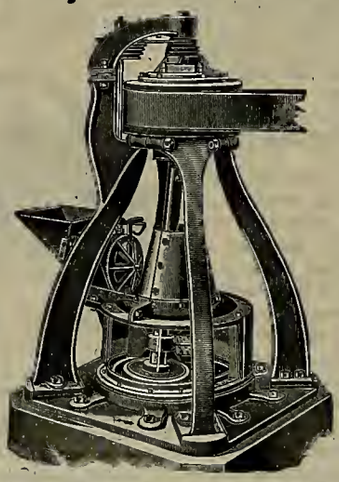

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The Midwinter Fair Exhibit.

The following address has been issued:

The Executive Committee appointed by the California Miners' Association at the last convention, for the purpose of supervising the State Mining exhibit for the Midwinter Fair, is perfecting arrangements as rapidly as possible, and expects the co-operation of the committees appointed in the different mining counties. These committees should act in conjunction with the Executive Committee in San Francisco, which latter has sole control of the general arrangement of the exhibit.

The Midwinter Fair Commission has granted free to the Executive Committee ten thousand square feet of space in which to make the proper representation of the mining industry, but they wish it all made in thet space. If special mining or mineral exhibits by separate counties, individuals or corporations are made elsewhere, the necessary space must be obtained from and will be charged for by the Midwinter Fair Commission, which fact should be understood by the county committees. In the space already set aside for the general State Mining Exhiblt, allotments will be made to the counties without charge, and they will be allowed to make their own installations, if so preferred. These, however, must he under the supervision of the Executive Committee, so that there shall be a harmonious whole when completed. The space heing limited, the exhibits must be compactly arranged, aod upon one general plan, for which reason the Executive Committee reserves the right of supervision.

The Executive Committee will be prepared tn give receipt for all articles sent to the exhibition. Safes will be provided for valuable specimens, police protection given, watchmen will be employed by day and night, and every possible care taken of articles on exhibition, but the committee can assume no finaocial responsibility in this connection.

Counties making separate installations must provide their own cases for specimens, etc.; but if articles are sent directly to the Executive Committee, showcases will he provided. It ls expected that each county, at its own expense and for its own benefit, will provide a competent representative, who shall not only have care of its exhibit, but be able to describe the mineral resources of the section.

The exhibits of ore, quartz or other minerals for the Mining Department will he transported both ways free of charge hy the Southern Pacific Compaoy, it being understood that the same are for exhibition only, having no commercial value, or, if valuable, not heing intended for sale. It is understood that if any lots of ore are turned over to the smelter, or otherwise disposed of commercially, the company shall be guaranteed regular freight rates on the same.

The county committees are urged to make as much haste as possible in their collection of exhibits, and promptly inform the Executive Committee of the space required. The Executive Commlttee reserves the right to so arrange the space at command as to allot it in proportion to the importance of the display.

EXECUTIVE COMMITTEE.

—The contractors in charge of the tunnel and other work at San Luis Oblspo have shipped a lot of men from this city to that point and the evident intention is to push the work to completion as soon as possible. Several weeks ago a large reduction was made in the working force and this is the first intimation of the intention to put on an increased force. It is said that more men will be taken down next week. There are seven tunnels to he pierced. The grading alone will cost $1,500 000. When this link is finished the hardest portion of the road will be completed, and the work of closing the gap between Elwood and San Luis Obispo will be carried along as rapidly as possible. Two thousand men are to be employed.

—To remove the piles from Stockton channel, contractors are using dynamite.

Coast Industrial Notes.

—Oregon is shipping apples to Texas.

—Many cars are loading walnnts in southern California for shipment East.

—Placer county fruit men in the vicinity of Penryn have decided to organize.

—The Spokane, Wash., City Council are discussing the question of abandoning electricity for gas ln street lighting.

—A petition is being circulated in Sutter Creek and vicinity asking the Supervisors to purchase anotber macadamizing machine.

—The editor of the Needles *Eye* recently went to Vanderhilt mining camp, and returns convinced that its future is most hright.

—Work on the San Pedro, in Victoria harhor, under the new plan to raise her, is progressing, but the repairs to the cofferdam are not completed.

—The people of Nevada City and Grass Valley are considering the advisahility of rehuilding the grand stand and stables recently hurned at Glenbrook race track.

—The last rain in southern California was more injurious to crops than was supposed. Much ot the second raisin crop was spread and in some vineyards this crop was ruined.

—Stockton police officers are indignant at an electric street-car line that has made a rule compelling members of the force to ride on the front platform or pay regular fare. They refuse to ride at all now.

—Enterprising citizens of Washington have tried the experiment of shipping apples and pears to China and Japan. In every instance so far the fruit has reached its destination in good condition.

—It is reported that southern California capitallsts are considering a proposition to locate a beet-sugar factory at Stevens, on the Asphalto branch of the Southern Pacific line, north of Buena Vista lake reservoir.

—The Spokane (Wash.) County Commissioners have sold $300,000 courthouse and funding bonds for par, the accrued interest and a premium of $3427. Theis & Barrol made the highest bid and got the bonds.

—The Escondido, Cal., irrigation district directors have contracted for the Woods valley for a reservoir site for the district; the price stipulated in the contract was $9,000 to be paid for in irrigation district bonds at par.

—The Picacho Gold Mining Company's pumping plant cost, with the 11-inch pipe line, which is five miles in length, $155,000. The mines are situated 500 feet above the pumps, which are on the hank of the Colorado in San Diego county.

—The total registered tonnage of the wheat ships that have left Tacoma (Wash.) since September 2d, those now there loading and waiting for cargoes, and those known to be on the way to Tacoma from foreign ports, amounts to 440,191 tons.

—The Northern Pacific railroad has hauled an average of 600 cars of shlngles every month so far of the present year from Puget sound to Eastern cities, and 200 carloads a month for the same time have been shipped by water to Hawaii, Australia, South America and Europe.

—A Vancouver, B. C., paper announces that the Great Northern Railway will extend its telegraphic line from South Westminster to Vancouver, giving Vancouver a competing line. A local representative says that the scheme is contemplated, though he has had no official notice.

—Vancouver people will pray the dominion parliament for lower duties on mutton, pig iron, telegraphlc cables, and abolition of duties on wheat and natural products, with a rebate of dutles on iron and glass when exported as manufactures. Reciprocity with Australia will also he asked.

—The cootractors boring the new gas well at the Stockton Insane Asylum are io difficulty. A large iron roller became detached from the apparatus and dropped to the bottom—1780 feet below the surface. They are now trying to move the obstruction to one side so that work can go on.

—President Blake of the Nevada Southern Railway, makes the statement that the road will be at once extended with all the energy and dispatch possible to the coal fields of southern Utah. The company have secured the right of way and the means to carry its road for 150 miles farther than its present terminus, and that will bring the cars into the center of the coal fields of Utah.

—An English company is buiding a pipe line from the Colorado river to Picacho, a distance of five miles, to wash placer ground, says the Tombstone *Prospector*. That district is very rich in gold and there is an abnndance of water in the Colorado river to wash out acres of placer ground. There is no reason why the scheme should not prove a success.

—Contracts for building a new ward building for the State Insane Asylum at Highland have been awarded as follows: Masonry and iron work, etc., to Rilley & Loane of San Francisco, $48,000; carpenter and plasterers' work, etc., to Dewar & Chrisholm, $19,354; plumbing and gas-fitting to Byrne & Drew of Redlands, $6650; galvanlzed iron and tin work, $4100, to C. A. Earhardt of Los Angeles; painting to George Stephens of Los Angeles, $1385.

—The Superior Court of San Bernardino county is now occupied in the trial of the Artificial Stone and Improvement Company, against the owners of the property fronting on First, Second, G, F, C, D and E streets to enforce a lien created by the construction of the sewers five years ago. The defendants claim that the sewers were laid in a faulty manner and that the Board of Trustees acted without authority of law in ordering the sewers laid. About $75,000 is involved in these suits.

—The Southern Pacific is getting ready to put into effect a new local freight schedule which will be a radical departure from all the schedules heretofore in force. The new schedule means the practical adoption of the western classification, which makes a uniform classification of articles and fixes a uniform rate hased on mileage. There will be some modifications of the western classification, made necessary by exceptional local condltions, but in the main it will be followed.

—The creditors of I. Brownstone & Co., merchants of Selma, Fresno county, have petitioned the Superior Court to declare the firm lnsolvent. The petitioning creditors and the amounts alleged to be due them are: P. Berwin & Co., $2265.05; Esberg, Bachman & Co., $564.35; Sachs Bros. & Co., $577.99; G. M. Kutz & Co., $669.56; Murphy, Grant & Co., $625.26. A similar petltion has been filed against I. Brownstone & Sons of Sanger, Fresno county. The petitloning creditors and their claims are: Sachs Bros. & Co., $939 65; G. M. Kutz & Co., $1161.57; A. & T. Weil & Co., $967.54; M. Franklin & Bro., $641.72; Murphy, Grant & Co., $108.41.

—Passenger rates East have taken an upward turn, all of the schedules applying to the World's Fair business having expired. For absolutely continuous trip first-class and second-class tickets from San Francisco, San Jose, Los Angeles, San Diego, or other California points usually taking San Francisco rates, are as follows:

	First class.	Second class.
Chicago	$57 00	$52 50
Chicago, via New Orleans	72 50	52 50
St. Louis	52 00	47 50
Memphis	55 00	47 50
New Orleans	62 85	47 50
Cleveland, Ohio	67 00	61 25
Cincinnati, Ohio	61 00	56 50
Cincinnati, via New Orleans	67 00	56 50
Chattanooga, Tenn	64 00	56 15
Montgomery, Ala	64 00	52 50

—Schacht, Lencke & Steiner, commission merchants at 16 and 18 Drumm street, last week called a meeting of their creditors for the purpose of asking for an extenslon of time. Their principal business consists in buying and selling dried fruits, honey and mother-of-pearl shells, and in shipping cascara bark to Germany. The assets are close on to $110,000 and the liabillties do not exceed $84,000. Among the financial assets of the company are 20,000 shares in the Ybarra Gold Mining Company of Calmilia in Lower California, a stock company incorporated for $1,000,000, there heing 100,000 shares at $10 each. The assets include a secured claim for $40,000 against the mining company for goods furnished during the past two years.

—At a recent meeting held by the Stockton real estate men and property owners, a committee was appolnted to draft a petition asking the Supervisors and City Council to call a bond election to vote $350,000 bonds to build a ship canal through the tule land from Stockton channel to a point on the San Joaquin river, 12 miles below the city. It was explained that at the time of the survey it was thought to be almost impossible to build on account of the great cost. The cost has been reduced by the construction of large, powerful dredgers, which work so cheaply that, in the opinlon of the city surveyor, the canal can now he built for $350,000. A canal can be built over the indlcated course, 120 to 125 feet wide on the bottom and 150 to 200 feet on top at the cost stated. Dredgers can now well afford to take the contract at 2½ cents per cubic yard, while in the days of engineer Alexander the estimated cost of the digging was 17½ cents per cubic yard.

Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ON THE 800 LEVEL.—*Ledger*, Oct. 27: The nndergrnond force of the Gover was pnt to work at the 800 level last week during the time the shaft below was being repaired. A small seam of rock which showed a trace of gold waa followed up with astonishing results. The seam has widened out to four feet end is full of minerel.

The new blecksmith shop at the Kennedy is aboot completed. The workmen will move into and occnpy it during the comiog week. The new building at the south shaft has been commenced, and as soon as it is possible to get around to the work a new gallows frame will he erected. The intention is to place the rock-breaker at the sonth shaft elevated so that a chute will cerry it to the mill. The rock from the north shaft will he ruu to the south shaft in cars end elevated to dump in the rock-breaker.

Butte.

A CLEAN-UP.—*Mercury*, Oct. 28: Sopt. L. L. Myers of the Spring Valley mine at Cherokee errived in town to-dey at noon, having in charge a gold bar valued at $11,000. It wes placed in the express office for shipment to the Mint. The bar is the result of a clean-up of a company of Portuguese who have leased grouod from the company aod have been drifting it out. This emount is the result of several months' run.

The Spring Valley mine is yet one of the richest mines in the State. The decree against hydraulic mining and litigation have kept it closed down for several years. It will never be worked by the hydraulic process again, yet the mine is still rich. It is only a question of time when it will be reopened as a drift mine. The gold is there, and it will eventnally have to come out. Theo Cherokee will boom as it did in days of yore.

A FINE NUGOET.—Chico *Enterprise*, Oct. 20: This moroing there was brought to the Bank of Butte County from the Contolenc mining section, above Magalia, a fine nugget of gold weighing 10¼ ounces, and valued at $180. It was brought to town by Mr. Contolenc as a small specimen of what the mines in that section of Botte are turning out.

Calaveras.

MINE BONOED.—*Chronicle*, Oct. 27: The Starlight mine, owned hy Chas. Werle of this place, and sitoated in Chili Gulch about two miles from here, has been bonded to Jacob Powley, C. W. Watkins and W. L. McCrey. Active operations will commence at the mine next Monday. A new teo-stamp mill will be erected at once.

El Dorado.

COMPLETED.—*Republican*, Oct. 26: The chlorination works at the Oro Fino mine have been completed and are in operation by Laoe & Hayward. These veteran miners appear to find encooraging developments in the mine as the work advances, for everything so far coustructed ahout it is done substantially and with a view toward permanency. The ore is said to he improving as greater depth and extension is reached, and, if the preseot good prospects continue, the mill, which now comprises 20 stamps, will he enlarged to 60 or 80. There is an extensive helt of low-grade ores extending north and south of the Oro Fino, and, if the present venture continues to he successful, this county may eveotually contain some of the largest milling plants on the coast.

Nevada.

SALE MADE.—The *Union* is reliably informed that arrangements have been completed for the sale of the Stockbridge and Great Britain claims on Massachnsetts Hill to Jas. D. Hague, Esq. In spring, operations on a big scale will he in progress at that place.

STARTED UP.—*Transcript*, Oct. 26: The new hoistiog works at the Home mine, on Deer creek, were started np this forenoon. Charles Stepp, treasurer of the company, and A. Goetz, one of the directors, arrived here last night so as to he present when the machinery was started. A collation was served at the mine and the occasion duly celebrated. To-day was the time set for lettiug a contract to sink the shaft 100 feet.

At the Champion mine the large new hoisting machinery was started up to-day, the event oeing the occasion of considerahle jollity among the owners and employes. The ponderous machiuery works very smoothly.

BOUGHT A MILL.—*Transcript*: The company that recently located an extensive quartz deposit on Sweetland creek have arranged to huy the mill at the Red Chief mine in Sierra county. Thomas Dillon went up to close the hargaiu and to superintend the removal of the mill.

GOON GRAVEL.—Virginia City *Chronicle*: A friend visiting from Nevada City says that some very good gravel is coming out of the second side drift in the Centennial miue, which will pay well for washing when the company gets ready for it. The gravel hed is thicker, with coarser wash howlders, and heavier gold than the front channel. It is proposed to get in the lomher for sluices, shortly. The Centennial is considered chief among the gravel mines of the famous ridge.

MINING PROSPECT.—*Telegraph*, Oct. 28: Down at Shehley's ranch there is a fine prospect. Mr. Shehley has a ledge ahout four feet in width and he has sunk a shaft 40 feet deep upon it. The quartz is encased in slate and serpentioe, and

gold is sprinkled tbrough it. A novel piecs of machinery is placed on the prospect. It hoists and pumps separately or collectively, and is mads from tbs several portions of mowing machines. Mr. Shebley, and Robert Scanlan, who is associated with bim in tbe mining ventnre, tbink tbey have a prospect that bids feir to becoms a dividend payer.

To START UP.—*Transcript*: The Fountain Head and Cold Spring gravel mines ere located on tbe Washington ridge, near the Hermony mine. In years past considerable work was done in the Cold Spring and some rich gravel taken out, but it wes found that ths company's sheft was too low down on the ridge and operations were suspended. The face of the inclins is in bedrock, tbe natnral raise of wbich is toward and into the Fountain Head. On tbe Fountain Head grounds hoisting worke havs been erected. It is the intention to consolidate these two claims, which will give 8000 feet along tbe course of ths true channel. The results in the Eest and West Harmony mines demonstrate beyond a doubt the existence of valuable gravel deposits for miles along ths ridge.

RICH GRAVEL UNCOVERED.—*Transcript*: A gentleman who came down from the San Jose gravsl mine informs us that splendid gravel was uncovered in that mine a few days ago. On Thursday last they found a nugget worth $7, and on Friday one worth $4, and the gold in the gravel indicates that they have got the genuine rich channel which they have beeu running for dnriug the past three or four years. Now that they know juet where it is, it will not be long before that company will be on velvet. They own a large extent of territory, and the indications are that it ruus through their entire property.

MINING NOTES.—*Transcript*: The Odin is looking fine and it is believed that they have levied their last assessment.

In the course of three weeks the mammoth machinery of the Champion will be ready to start np; it is the heaviest in this part of the State.

Nothing but good news comee from the Providence. The ledge continues to enlarge and the rock is all of very high grade. The outpnt of bullion from the mine this mouth will he between $20,000 and $30,000. The five men who own this mine are those who are going to build tbe electric railroad betweeu this place and Maryeville.

Iu the morning and at evening, miners, with their dinner buckets, can be seen in squeds going and coming from work in all directions. It is a pleasing sight, showing as it does the large nnmber of men employed in and about the mines of thie district at the present time.

The tuunel at the Harmony mine is nearly completed, and, as an old miner said after going tbrongh it, "if they have not got the biggest and richest gravel mine in the State, then I'm the worst fooled man in the world." Bullion in large quantities will soon be coming out of that mine. It is there. The company ie now employing abont 30 men.

The Pittsburg mine has at lest a fine show of becoming a handsome piece of property. The principal portion of the etock of this compeny is now owned by San Francisco parties. A short time eince the tributers there went to work on a small ledge of inferior rock and now the compeny ie working it and they have a foot-and-a-half ledge of as good-looking rock as was ever eeen in the mine.

There are over 600 men at work in the mines in this district. In this estimate we do not include the nnnsually large nnmber of prospectors. The mines have all the men they want, and it ie no place for miners to come to from abroad with the expectation of getting work, ae none can be had.

Placer.

HYDRAULIC MINE TO START.—Colfax *Sentinel*: E. C. Uren surveyed for a eite for a dam in Little Bear river between Dutch Flat and Liberty Hill last week. This dam ie to be built to receive the debrie from the Polar Star mine at Dutch Flat, of which John Speulding has control. As Little Beer river has not a very large watershed, it will be comparatively easy to make a wasteway to carry all the water that comes down during the winter. The site is such that, no matter how high the dam is raised, the new wasteway can easily be made. Besides, the site will afford the imponnding of more debris than can be washed from the Polar Ster mine. It is not expected that the Debris Commission will refuse a permit, as it is intended to bnild a good, enbstantiel dem. This eite is not far from the Liberty Hill dam, which has stood the test of ten yeare time and is more secure to-day than ever. A curious feature of the Liberty Hill dam ie that already natnre has hastened to make it doubly secnre by sending up a perfect row of alder trees on the inside of the dam along the rock well. The trees have already attained a height of over 25 feet, and are growiug so closely together as to make a perfect bulkhead in themselves. Other treee are eprouting up in the dam, and, where once there wae nothing but barren tailings, in a few years there will be a fine little forest.

GOOD CLEAN-UP.—*Herald*, Oct. 27: From 34 tons of ore recently taken out of the Morning Star mine by Sam Kaiser and Will Till, they cleaned up $1500, or about $44 a ton. The Morning Star is owned by Otto Walters of Opbir.

Ben Hawkin is fixing up the Eclipse mill for the purpose of cruebing the rock on the Eclipse dump. He hauled 17 tons to the Ophir mill and realized from it $500.

The Moore mine has made another clean-up, this time from $1500 to $2000. This famous property is keeping up its record in fine shape.

The old buildings at the Green mine are being removed.

The Boulder miue at Ophir, the property of L. Ferguson and E. H. Huchison, is starting up. The hoistiug worke will be completed the coming week, and an eight-stemp mill is being erected.

Plumas.

WILL START UP.—*National-Bulletin*: Messrs. Jas. O'Brien and A. B. White returned to San Francisco on Saturday after spending a couple of days at Spanish Ranch looking after the interests of tbs Qnincy Mining and Water Co. Both gentlsmen are directors of the company. Mr. Whits being tbe superintendent. Tbe latter gentlemen will retnrn to Spanish Ranch in a few deys and rsmain till winter sets in. The work of getting their property ready for operation will bs pushed with all possible energy. Uuder the management of Assistant Supt. C. R. Thompson, work on the big ditch, reservoir and the sawmill has been progressing rapidly, and it is probable that the erection of a large reetraining dam will begin in a very short time. Over 60 men are now employed by the company, and ths Spanish Ranch country now preeents a lively appearence. Undoubtedlv, the Qnincy Mining and Water Co. controls a large amount of the best mining ground in Plumas, and will be amply rewarded for the big outlay of money now being made. The placers in the vicinity of Spanish Ranch have yielded np their hundreds of thonsands in years gone by, and there yet remains a large aree of nntouched gravel deposits which, in consequence of plaus now maturiug, will prodnce as mnch more.

NEW ENTERPRISE.—*National-Bulletin*, Oct. 19: During the past summer the Northern Placer Mining Company did qnite a lot of work on their extensive miuiug property uear Cromberg, building a reservoir at the head of Little Long Valley creek and constructing three and one-half miles of ditch and the necessary finmes to conduct the water to the large body of gravel which it ie desigued to wash. From Mr. E. J. Sugden of Pittsbnrg, Pa., who is president of the company, it is learned that uuder the snperintendency of Mr. Trayner the property is being pnt in good shape for active operations next year. It is the purpose of the company to build restraining dems, though, cousidering the location of the property, snch work could hardly be deemed a necessity. The gravel bed is of a large extent and from it it is believed that much wealth will be obtained.

San Bernardino.

SLIDING SCALE OF WAGES.—Hawthorne *Bulletin*. Peter Hattou (Shorty) writes as follows from Calico, San Bernardino county, to a friend in Hawthorne:

I am working every day, but the weges are small. The miners are working on this sliding scale:

	Per ounce.	Wages.
When silver is	50	$2.00
Silver	70	2 50
Silver	80	2.75
Silver	90	3.00
Silver	1.00	3.50
Silver	1.25	4.00

At present wages are $2.50. This is a good plece to work. There are three mines working and they employ 200 men.

Siskiyou.

GOOD AVERAGE.—*Journal*, Oct. 25: The Greenhorn blne gravel mine etill continues to yield good returns, averaging abont $100 a day, with only two pickmen, the water supply being too light to pnt on a large force. As soon as winter rains increese the water supply, several more men cen be put to work at advantege.

Garvey, who owns the ranch on the Yreka eide of Greenhorn, hes been sinking a well for water to irrigate his land, and is finding good prospects, which may induce him to cerry on miuing operations also with essurence of good success. W. M. Thomas, of Greenhorn, showed us a piece of quertz about half as large as a man's fist, which seemed to be nearly half gold. and worth probably $50. He is making an effort to find the ledge where this float piece ceme from, which he expects will prove a rich bonanza.

The Spangler Bros., at mouth of Humbug creek, have commenced drifting, in order to strike the pey channel, when they will start up the machinery again to meke an open cut.

IDAHO.

IN THE COEUR D'ALENES.—Spokane *Review*, Oct. 18: A. P. Wiuslow, of Wardner, is in the city. Mr. Winslow is manager for the Inland Telephone Company of that place. "There are still 180 men, or abont that number, working on the Bunker Hill and Sullivan," said Mr. Winslow, "end I should estimate the number of idle men in the town anywhere between 400 and 600. Laying off the night shift tbrew 100 men out of employment. If the Last Chance case is ever decided so that work can begin on it, that in itself will he a big thing for the town. The Last Chance has rich ore end is in a good position to work it economicelly."

MONTHLY REPORT.—Idaho *Nugget*: Following is a eynopsis of the manager's report to the DeLamar Mining Co., for the month of September, 1893:

No. of tons crushed	3,353.45
Value of bullion produced	$81,052.52
Ore shipped	5,000.00
Miscellaneous receipts	708.97
Estimated profit	$47,295.27

GOOD PLACERS.—Wood River *Times*: Reuben Clayton is confident that, after 15 years of prospecting, he has at lsst caught on to a good thing. He has located and opened 80 acres of placer ground at the head of Little Smoky creek, just above the claims that Newton Revie has worked during the past 20 years.

He has already opened the ground, got water upon it and extracted five ounces of gold in a few daye' trial rnn. All he needs now to work steadily is to pipe the water, as by running it in open ditchee he will lose too much of it and cannot control it. The eeason being too far advanced to begin plecer-miuiug operations, he will doubtless wait until spriug before putting in his pipe; but with the opening of the season he will begins washing, and looks forward to making quite a clean-up next year.

Dan Tobill, and "Uncle" Wilson, tbe well-known prospector who was one of the owners of the Hnb at Era, and the Black Spar at Muldoon, are interested with him, and the tbree of them will be able to handle tbe property without hiring over two or three men.

OREGON.

THE GOLDEN FLEECE.—Ashlend *Tidings*, Oct. 27: Tbe Huntington mill for tbe Golden Fleecs mine arrived last week, tbe building for its occupency is coustructed, and the water wheel whicb ie to furnish power to rnn it is being set in place. Dr. Flanagan and Messrs. Shannon and Hill, who were at the mine Wednesday, report that they hope to see the mill running in two weeks.

The prospect of a successful issue of this new enterprise hes turned attention of mining men to that locality, and the lands adjacent to the claims of Shannon & Hill are looked npon with covetous eyee. Mrs. Kilgore, who owns the 22-acre trsct including the buildings and orchard of the old Hammond or Rockfellow place, has given a bond upon it to Mr. Hough for 30 days, the price being $4500, $100 being paid down to secure the bond. Postmaster Hammond, who owns 80 acres higher on the hill, has also given a short bond on it to other perties.

Lon. Edwards has his men at work at the Hope mine, which was bonded a short time ago by Gnnd & Edwards. They ars cleaning out tbe old prospect shaft at a point near the dividing line of the "Hope" and "Shorty" claime. The shaft was filled up with waste by the men who worked the miue last. After it ie cleaned out and retimbered it will be sunk deeper npon the ledge, in prospect work.

W. W. Walters went over to Sawyer'e Bar the first of the week, to pnt J. M. Harney and another man at work upon a mining claim in wbich he is interested with a San Francisco party.

Mr. Dnun, a geologist employed by the California Stete Miniug Bureau, hae been tracing the famous "blue lead" up throngh Californiia from the mining connties in the central part of the State through the northern counties to the Siskiyon monntains. At Klamath river he fell in with C. B. Jilson, the original blue lead discoverer and proprietor of the Siskiyou region, and in company with Mr. Jilson came over to Ashland Tuesday evening. Theory and surface indicatione trace the blue lead under the Siskiyou mounteins into this valley, but as this is ontside of Mr. Dnnn'e territory he did not put in any time at explorations here.

A GOOD RECORD.—Baker City *Democrat*, Oct. 23: The time ie rapidly approaching when prospect work on the mountains end placer mining in the gnlches must close until the snow disappeare in the spring.

The eeason just closing has been a most prosperous one for this section and generally epeaking there is no ground for complaint. When the great depression spread its dark shadow broadcast over the land and the cry of hard timee was heard on all sides, onr minee came to our rescue, producing the yellow metal in goodly qnantities and there was no stegnation felt in Baker City.

Our quertz miners will continue operations all winter and the work that will be accomplished before spring will add not a small nnmber of well developed properties to our already large list.

All of our bnllion producers, which have eent in regular ontpnts for many months past, will keep on producing during the winter mouths with their usual forces.

TO CRUSH ORE.—Jacksonville *Times*, Oct. 27: Ezra Poppleton and H. T. Bishop, of Tacoma, are making preperations to crush the ore from the Owene mine in Jackson Creek district and have alreedy shipped machinery from Tecoma, which is expected here soon.

Wallace Rogers and A. J. Jackson have nneerthed a three-foot ledge near the Shennon & Hill mine, which promises to be very rich. The first assay on the surface went $17.50 to the ton. A force of men are at work and if the ore ie as rich at a depth of 25 feet a mill will be put in.

A hydraulic giant will eoon be put in at the Illinoie Mining Co.'e claim in Althouee district, Josepbine county. They have some rich ground tbere and intend to work on a large scale. The claim was worked in eerly days by a couple of Germans, who took out eeveral thousand dollars, and, being satisfied with their haul, left the country. H. L. Doney end Dr. J. M. Teylor found the old workings, while on a prospecting tonr in July last, and waehed out some rich dirt and found some good-sized nuggete.

A NEW MILL.—Baker City *Democrat*: The Marotte mine at Sparta is developing into a promising property, from all accounts. It is owned by Mr. Geo. W. Robinson, of Detroit, Michigan, and is under the mauagement of Mr. John Thomae, the well known practical miner.

Mr. Thomas is in receipt of a letter from Mr. Robineon in which he is authorized to close the purchase of a mill for the property, arrangements for which were partially made before Mr. Robinson weut East.

The mill being negotiated for is a ten-stamp plant owned by John Ruth at Ruthbnrg, Idaho. Mr. Thomas will proceed at once to prepare the mill for removal to Sparta.

TRAIL CREEK PLACERS.—Baker City *Democrat*: Messrs. Joseph Tbibodo and Earnest Nadeau, owners of the Trail Creek placer mines in Granite district, have arrived in this city. They brought in with them 122 ounces of gold, or about $2000, the product of the mines eince a former cleanup made a few weeks ago. The gold was deposited at the First National Bank for sbipmeut.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING OCT. 10, 1893.

506,356—WATER PIPES—Bedbury & Badgley, S. F.
506,493—PRESERVING WOOD—F. Hall, Tacoma, Wash.
506,504—HEADER—O. B. Hollis, Spokane, Wash.
506,508—WHEEL—Jaques & Kester, Spokane, Wash.
506,523—CAR-COUPLING—Jas. McDonough, S. F.
506,511—FAUCET—H. E. Thomas, S. F.
506,566—INDEX—Jas. Thorne, Oregon City, Or.
506,294—TELEGRAPH-TRANSMITTER—C. Willoughby, S. F.
22,834—DESIGN—D. Walsh, S. F.

FOR WEEK ENDING OCT. 17, 1893.

505,764—WEED-CUTTER, ETC.—A. N. Beebe, King City, Cal.
506,975—WATER-HEATER—J. B. Butterworth, S. F.
506,980—CLOTHES-PIN—J. W. Cook, Harrisburg, Or.
506,814—VEHICLE GEAR—A. Dratt, S. F.
506,993—GAGING SAWTEETH—E. J. Gould, Cedar Home, Wash.
506,877—HARVESTER—Benj. Holt, Stockton, Cal.
506,873—CAN BODY MACHINE—R. D. Hume, Gold Beach, Or.
507,072—JOURNAL BOX—J. C. Kilton, Los Angeles, Cal.
505,931—DRILL BRACE—W. P. Nolan, S. F.
506,934—PLUMB LEVEL—John Petit, San Diego, Cal.
507,045—COLLAR—J. Stern, S. F.
507,048—PLANTER—E. H. Suhl, Peniosular, Or
505,748—PROPELLER—H. Thibault, Stockton, Cal.
506,749—CAR VENTILATOR—C. B. Titcomb, S. F.
506,838—BINDER FOR SEWING MACHINE—C. L. Torr, Petaluma, Cal
506,891—CASH-REGISTER—F. W. Vaughan, S. F.
506,892—BALING PRESS—John Wiebe, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained throngh Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of especial mention:

BINDING ATTACHMENTS FOR SEWING MACHINES. Chas. L. Tarr, Petaluma. No. 506,888. Dated Oct. 17, 1893. This inventiou is for the purpose of applying binding to the edges of goods in a mechauicel manner and without the assistance of an attendent. It consists of a guide and tension device through which the binding material is delivered from the roll to the biuder proper. The materiel firet passes between the adjustable tensiou rolls and thence to a guide, which folds the edgee of the material over eo tbat it ie in coudition to pass directly into the biuder when it is applied to the goods.

TRAVELING HARVESTER. — Benjemin Holt, Stockton, Cel. No. 506,877. Dated Oct. 17, 1893. The object of this inventiou is to provide an extended and self-adjusting bearing for traveling harvestere whereby the weight is better supported upon soft and yielding surfaces, and the tractile force is much increased in cntting heevy grain. It conciets of eupplemental bearing wheels and frames in which they are journaled so as to act in conjunction with the main wheels and provide an extended beering surface when traveling over soft gronnd. These wheels have also driving cbains or gear by which their power is added to that of the main wbeele to drive the cutting and other mechinery, end clutch mechanisms wbich allow them to travel at different rates of speed iu turning cornere.

SIDE-HILL VEHICLE.—No. 507,370. Deted Oct. 24, 1893. Christian Koenig, of Secramento, Cel. This vehicle, as its name implies, is adapted to travel on side hills. It can be readily couverted from a two into a three-wheeled vehicle. It has a pivotally mounted axle, adapted to be rocked in the direction of its length, whereby the wheele are thrown out of the same horizontal plane, in order to enable the vehicle to move conveniently over sloping ground. This movement of the axle is effectsd and controlled by the driver by meens of suitable connections within reach. The front of the vehicle is eo constructed as to readily permit the plecing end the removel of a third wheel whenever desired.

LUBRICATOR.—No. 507,409. Dated Oct. 24, 1893. George W. Boyd, of San Francisco, Cal., assignor of one-half to Findley Buchenan and Petrick H. Buchanan, of seme plece. This is an improved lubricator of tbat class in which the lubricaut is contained within a cup and is forced out by means of a spring-actuated plnnger carried by the cap and operating within the cnp, the plunger being controlled by an exterior nnt npon its stem. The particnlar improvement lies in a valve in the plunger, which operates automaticelly and hes the function of providing for the admission of air to tbe cup when the plunger is relieved from its pressure upon the lubricant, for any purpose, as for refilling, thereby avoiding the back suction, which is disadvantageous in that it witbdraws the lubricant from tbe journal, leaving it dry.

DOUBLE-ACTING HYDRAULIC ENGINE.—Frank Bernardi, Mokelumne Hill, Cal. No. 507,405. Dated Oct. 24, 1893. This engine consists of a cylinder having proper inlet and discharge passages and a piston operating in tbe cylinder; an oscillating valve controls the passages and this valve ie actuated by a longitudinally slotted rocking lever engaging the valve etem. Catches at each end hold the rocking lever at the limits of its movement. The lever is connected with the piston rod, and the latter carries a traveling contact which alternately releases the catches. This engine is a eimple and efficient one for working by means of water under head or pressure, and for transmitting its power to other machinery.

Market Reports.

The Markets.

SAN FRANCISCO, Nov. 2, 1893.

The repeal bill is now a law, and silver has suffered a sharp decline—not so serious, however, as that which followed the closure of Indian mints to free coinage in June. Silver in June was down to 62 cents; in London the lowest price was 30⅜d. It is a curious circumstance that the imminent repeal of the purchase clause had no effect upon the London market until last Monday, while the decline in New York began nearly a week before. The silver purchases under the old law have ceased. The last offering to the treasury officials occurred yesterday, when 70 cents was asked for 30,000 ounces and 68.25 offered and refused.

Copper and lead have been weak.

Silver in October.

At the beginning of October, fine silver was quoted at 34⅛d in London and 73¾c in New York. These were the best prices for the month, and lasted only for a single day. The other extreme was reached at the close of the month, when the price was 31⅛d in London and 68c in New York. The extremes in both for the first ten months of the year were as follows:

	London		New York	
	High.	Low.	High.	Low.
January	38 9-16d	38 2-16d	84 c	82½c
February	38 8-16	38 2-16	84⅛	83¼
March	38 6-16	37 9-16	83⅝	81⅞
April	38 5-16	37 14-16	83¼	82½
May	38 9-16	37 8-16	84⅛	82¼
June	38 12 16	30	83¼	62
July	34 12-16	32 2-16	75	69
August	34 12-16	32 11-16	75⅛	70¼
Sept.	34 8-16	33 14-16	74⅞	73
October	34 2-16	31 8-16	73⅞	68

In October, 1892, the extremes in London were 39 14-16d to 38 2-16d, and for the first ten months of that year 43 12-16d to 37⅜d.

Coinage of the Local Mint.

The October coinage of the San Francisco Mint compares as follows:

	1892.	1893.
Double eagles	$1,400,000	$1,362,000
Half eagles	412,500	280,000
Standard dollars	100,000	.....
Dimes	.....	80,000
Totals	$1,912,500	$1,720,000

Silver and the Metals.

NEW YORK, Nov. 2.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.	Copper.	Lead.	Tin.
Thursday	33½	72¼	....	....	.....
Friday	33¾	71¾	9 40	3 42½	20 80
Saturday	33½	71½	9 40	3 40	.....
Monday	32⅜	69¾	9 50	3 30	20 55
Tuesday	31½	68	9 50	3 30	20 40
Wednesday	31½	68	9 75	3 30	20 60

San Francisco Metal and Coal Market.

ANTIMONY.
Per lb ..... — @ 13

BORAX.
Refined, in car lots — @ 7½
Powdered, do... — @ 7
Concentrat'd, do — @ 6½
All grades jobbing at advance.

COPPER.
Bolt ..... 23 @ —
Sheathing ..... 23 @ —
Ingot, jobbing .. — @ 20
Do, wholesale .. 16 @ 16

IRON.
Bar, base ..... — @ 2½
Norway, base ..... — @ 4½

PIG IRON.
Spot.
Eglinton ₩ ton ... — @ — —
Glengarnock ..... 27 00 @ — —
Am. Soft, No. 1 .. 25 00@ — —
Shotts No 1 ..... 27 00@ — —
Puget Sound ..... — @ — —
Clay Lane White .. 30 00@ — —
Langloan ..... 27 00@ — —
Cartsherrie ..... 27 00@ — —
Barrow ..... — @ — —
Cargoffeet ..... — @ — —

LEAD.
Pig ..... — @ 4½
Bar ..... — @ 5
Sheet ..... — @ 6
Pipe ..... — @ 5½

SHOT.
Drop, sizes *smaller* than B, ₩ bag of 25 lbs 81 75
Do do, B and *larger* sizes ₩ bag of 25 lbs 2 00
Buck, Balls and Chilled do, ₩ bag of 25 lbs 2 00

QUICKSILVER.
Home trade, pr. flask ..... 40 50 @41 00

STEEL.
English, lb ..... — @ 18
Canton tool ..... — @ 8½
Sl'k Diam'd tool 8½@ 15
Pick & Hammer. 9½@ 10
Machinery ..... 4 @ 6
Toe Calk ..... — @ 4½

PIG TIN.
Spot ₩ lb ..... 21½ @ 22

COAL.
SPOT FROM YARD—PER TON.
Wellington $8 00
Oreta 7 50
Nanaimo 6 50
Gilman 6 00
Seattle 6 50
Coos Bay 5 50
Cannel 9 00
Egg, hard 12 00
Wallsend 7 25
Scotch Splint 8 00
Brymbo 7 50
West Hartley 7 50

TO LOAD—PER TON.
Australian ..... 6 60@ —
Liverpool Steam . 6 37@ —
Scotch Splint ... 7 00@ —
Cardiff ..... 7 00@ —
Lehigh Lump .... 10 00@ —
Cumberland ..... 8 60@ —
Egg, hard ..... 9 00@ —
West Hartley ... 7 50@ —

COKE.
English, to load .. $9 60@10 00
Do, spot, in bulk .— @12 00
Do, in sacks ..... — @14 00
Cumberland ..... 9 50@ —

Mining Share Market.

SAN FRANCISCO, Nov. 2, 1893.

The Comstock market showed further improvement toward the close of last week, but has since weakened. Last Saturday the prices of the leading north-end stocks were higher than at any time since the revival began, two weeks ago, while business among the commission brokers continued large. During the forenoon Consolidated California & Virginia reached $3.10, Best & Belcher $1.65, and Opbir $1.55. Monday there was a continued active trade in the Comstock shares. The attendance in both board-rooms was larger than at any time since the revival began, and commission brokers were kept busy executing orders to buy and sell. Tuesday there was no abatement of public interest. At the opening business continued very active, and prices were generally higher. In fact the leading stocks, Consolidated California & Virginia, Opbir, Best & Belcher, etc., reached the highest prices attained since the Potosi deal in May and June last.

Yesterday the market relaxed and was much easier.

A dispatch from Virginia, October 28th, says that active operations in the Consolidated Virginia, suspended some time ago, were resumed October 27th under Foreman Charles Harper with a force of 11 men. Three shifts of four men each will be engaged in making repairs to the shaft down to the 1000-foot level. It is expected that the shaft repairs will be completed early in November, when an additional force will be employed in explorations, and operations in the West Consolidated will be commenced, which will be worked through this shaft. Little repairing to the shaft will be necessary until the 600-foot level is reached. The resumption of work at the Consolidated is regarded as the harbinger of more prosperous times for the Comstock.

Board Sales of Mining Stocks.

S. F. Stock Board.

TUESDAY, November 2, 1893.

9:30 A. M. SESSION.

200 Andes	35c	400	75c
350 Belcher	45c	800 Ophir	1.40
900 B & B	1.60	150	1.45
100 Bullion	25c	100 Overman	20c
50 Challenge	25c	900 Potosi	55c
450 Chollar	32c	400 Savage	60c
100 Con. Cal. & Va	2.95	150 Sierra Nevada	55c
1350	2.90	300 Sey Belcher	1½c
850 Crown Point	45c	150 Union	45c
700 G & C	60c	100	57c
100 H & N	55c	250 Yellow Jacket	55c
100 Mexican	80c		

2:35 P. M. SESSION.

200 Aita	15c	50 Gould & Curry	70c
450 Andes	40c	200	75c
100 Belcher	55c	250 Mexican	80c
250 B & B	1.75	400 Overman	20c
200	1.80	400 Ophir	1.65
100 Bodie	25c	570	1.60
450 Chollar	40c	100 Potosi	70c
900 C O & V	3.20	950 H Nev	55c
10	3.15	30 Union	55c
250 Crown Point	65c	400 Y Jacket	60c

Pacific Stock Exchange.

9 AND 10:16 A. M. SESSIONS.

200 Andes	35c	400	38c
600 Belcher	50c	200	35c
400 Best & Belcher	1.65	350 Ophir	1.40
450	1.60	400	1.42½
300	1.57½	350	1.50
600	1.70	300	1.52½
200	1.75	400	1.55
200 Caledonia	10c	550 S Nev	75c
200 Challenge	25c	1200	70c
450 C. C. & Va	2.95	200	80c
400	2.97½	400	85c
400	2.90	150 Kentuck	10c
550	3.00	300 Overman	22c
700	3.05	900 Savage	60c
400	3.07½	250	59c
200	3.10	400	62c
300 Crown Point	48c	700	67c
400	51c	700	68c
300	50c	600 S B & M	15c
600 H & N	55c	300 Union	45c
500 G & C	60c	200	50c
200	61c	400	55c
300	62½c	700	57c
300	65c	800	60c
300	68c	100 Yellow Jacket	66c
450 Mexican	77c	200	57c
400	77c	300	55c
200	82c	150	52c
350	77½c	300	58c

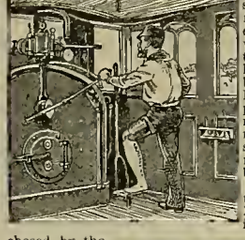
Cal. Debris Commission Notices.

NOTICE.—The California Debris Commission, having received petitions to mine by the hydraulic process from Westall and Hughes, in the New York mine in Sierra county, to deposit tailings behind a dam in Howard creek; from Corbiere and Bean, near Clipper Mills, Yuba county, to deposit tailings behind a dam in Hampshire creek; from W. A. and M. E Schofield, in the Phœnix mine, near Hepsidam, Sierra county, to deposit tailings behind dams in Whisky creek and the North Fork of Slate creek; from the Graycroft Mining Company, in the Graycroft Hill mine, near Downieville, Sierra county, to deposit tailings behind dams in Davidson ravine; from the Excelsior Mining Company, in the Excelsior hydraulic mine, near Downieville, Sierra county, to deposit tailings in and near Eagle ravine; from the Eureka Mining Company, in the Eureka mining claim, near Downieville, Sierra county, to deposit tailings behind dams in Kanaka and Sawmill ravines, and from the Quincy Mining and Water Company, in the Beau Hill, Jack's Hill, Mountain House, Gopher Hill and Shore's Hill claims, near Spanish Ranch, Plumas county, to deposit tailings in old hydraulic pits and behind dams in Maurer ravine, Spanish creek and Green flat, gives notice to all concerned that a hearing will be held a the office of the Commission, Room 92, Flood Building, San Francisco, on November 7, 1893, at 1:30 o'clock P. M. On and before this hour and date all parties interested may file affidavits, plans and maps in support of their respective claims. By order of the Commission: W. H. Heuer, Major, Corps of Engineers, U. S. A., Secretary of the Commission.

ARTIFICIAL LEGS AND ARMS

WITH RUBBER FEET AND HANDS.

It is not unusual to see an engineer with hand on the throttle, or a conductor, brakeman, fireman,



carpenter, mason, miner, in fact men of every vocation, wearing one or two artificial legs with rubber feet, Marks' Patents, and performing as much labor as men in possession of all their natural members.

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ASSESSMENTS.

COMPANY AND LOCATION.	No.	AMT.	LEVIED.	DELINQ'T AND SALE.	SECRETARY.
Amador C Mine, Cal	1	5c	Sept 7, Oct 12, Nov 7		F E Luty, 330 Pine
Arnold G and S M Co, Ariz	5	50c	Sept 19, Oct 23, Nov 9		A Judson, 320 Sansome
Belle Isle M Co, Nev	19	10c	Sept 23, Nov 2, 24		J W Pew, 310 Pine
Best & Belcher M Co, Nev	65	25c	Nov 1, Dec 5, Dec 22		L Osborn, Nevada Block
Butte Belle G M Co, California	1	8c	Oct 11, Nov 16, Dec 6		Chas H Ford, Crocker Building
Caledonia G M Co, South Dakota	17	60c	Sept 13, Oct 16, Nov 15		F G Drum, Mills Building
Challenge Cons M Co, Nevada	5	5c	Oct 10, Nov 14, Dec 5		C L McCoy, Mills Building
Chollar M Co, Nevada	29	10c	Oct 9, Nov 14, Dec 7		Chas E Elliot, 309 Montgomery
Cons New York M Co, Nevada	11	5c	Sept 27, Nov 1, Nov 22		Chas E Elliott, Nevada Block
Con Wyoming G M Co, Nev	3	5c	Oct 3, Nov 13, Dec 2		W J Gurnett, 308 Pine
Crown Point G & S M Co, Nevada	62	10c	Sept 26, Oct 31, Nov 21		James Newland, Mills Building
El Leopoldo G & S M Co, Mexico	4	1c	Oct 26, Dec 1, Dec 18		Jahez Howes, 214 Pine
Evening Star M Co, Cal	11	4c	Oct 11, Nov 13, Nov 29		J Scoville, 320 Sansome
Gould & Curry S M Co, Nev	74	10c	Oct 14, Nov 16, Dec 7		Alfred K Durbrow, Nevada Block
Granite Hill M & D Co	1	1½c	Oct 10, Nov 11, Nov 27		J M Wiley, Grass Valley
Gray Eagle M Co, Cal	34	5c	Oct 11, Nov 15, Dec 6		Chas C Harvey, 309 Montgomery
Hudson Bay Cons G M Co, Cal	1	10c	Oct 4, Nov 11, Nov 30		J H Sayre, 328 Montgomery
Idaho & Eureka N W Extension M Co, Cal	1	2c	Oct 14, Nov 14, Nov 30		Geo F Nourse, Sacramento
Kentuck Cons M Co, Nevada	7	10c	Oct 5, Nov 9, Nov 30		Aug Watsrman, 309 Montgomery
Martin White M Co, Nevada	29	25c	Aug 31, Oct 26, Dec 14		K L Ross, 120 Sutter
Mt George M Co, Cal	3	1c	Sept 26, Oct 31, Nov 18		J M Thomas, Grass Valley
Occidental Cons M Co, Nevada	14	10c	Oct 9, Nov 13, Dec 4		Alfred K Durbrow, Nevada Block
Polo-I M Co, Nev	39	25c	Sept 11, Oct 16, Nov 7		Chas E Elliott, 309 Montgomery
South Eureka M Co, Cal	6	1c	Sept 13, Oct 24, Nov 23		Abraham Halsey, 328 Montgomery
St John Quartz M Co	8	5c	Oct 14, Nov 15, Dec 2		J M Wiley, Grass Valley
Teresa Mining Co, Mexico	12	10c	Oct 27, Dec 7, Dec 23		K J Willats, Flood B'ld'g
Union Con S M Co, Nev	48	20c	Oct 3, Nov 8, Nov 29		Chas E Harvey, 309 Montgomery
Valenzuela Cons M & L Co	2	1c	Sept 20, Oct 23, Nov 10		A Everett Ball, 431 California

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE
Bulwer Con M Co	Special	L Osborn, 309 Montgomery	Nov 8
East Best & Belcher S M Co, Nev	Regular	C H Mason, 324½ Montgomery	Nov 23
Great Western Q M Co, Cal	Special	L Osborn, 309 Montgomery	Nov 8
North Gould & Curry G & S M Co, Nev	Regular	C H Mason, 324½ Montgomery	Nov 20
Occidental Cons M Co Nev	Regular	Alfred K Durbrow, Nevada Block	Nov 20
Silver Lick Cons M Co	Special	W Ladd, 531 California	Nov 11
Siskiyou Cons S M Co, Cal	Annual	Edward F Stone, 306 Pine	Nov 7
Trinity O M Co, Cal	Annual	L Wadham, 504 Kearny	Nov 6
Utah Cons M Co	Special	A W Havens, Nevada Block	Nov 10

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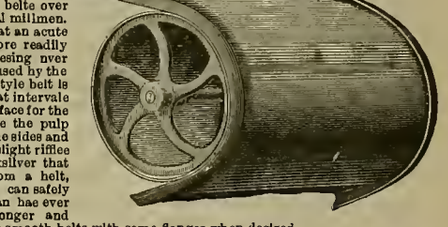

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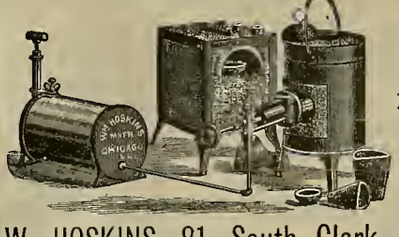

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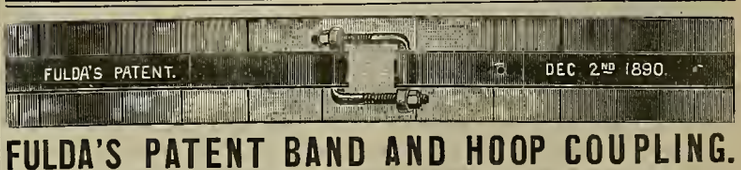

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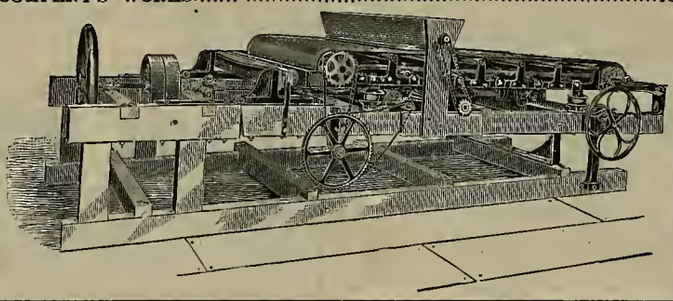

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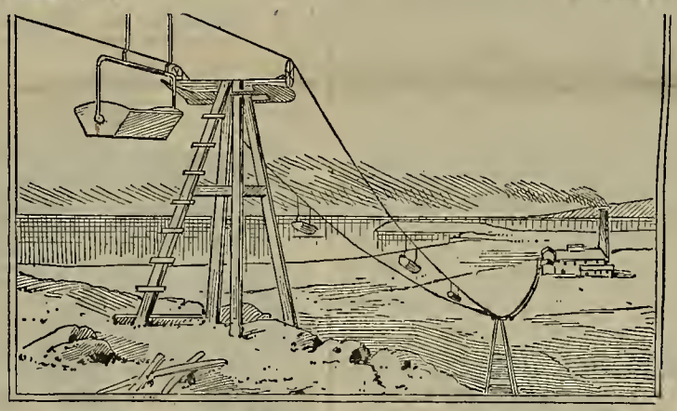

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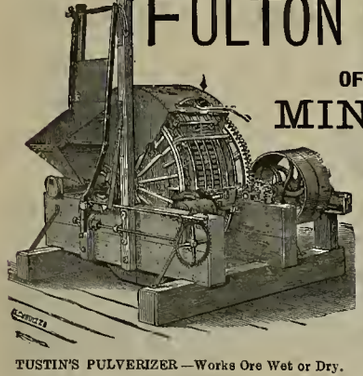

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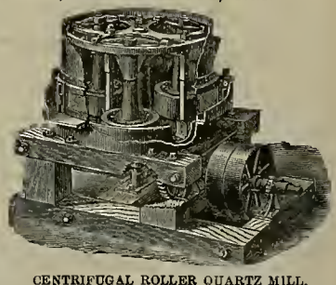

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An Illustrated Journal of Mining, Mechanics and Popular Science.

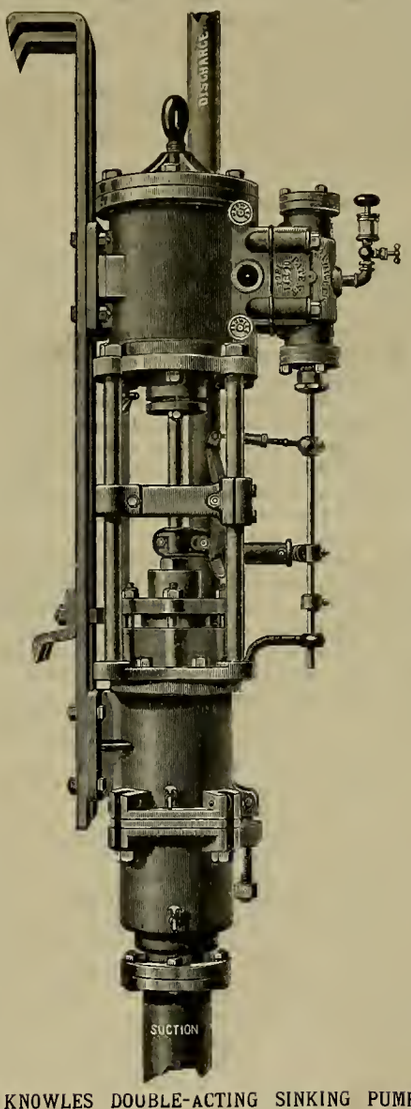
VOLUME LXVII. Number 20. SAN FRANCISCO, SATURDAY, NOVEMBER 11, 1893. Three Dollars per Annum. Single Copies, 10 Cents.

Knowles Patent Mining Pump.

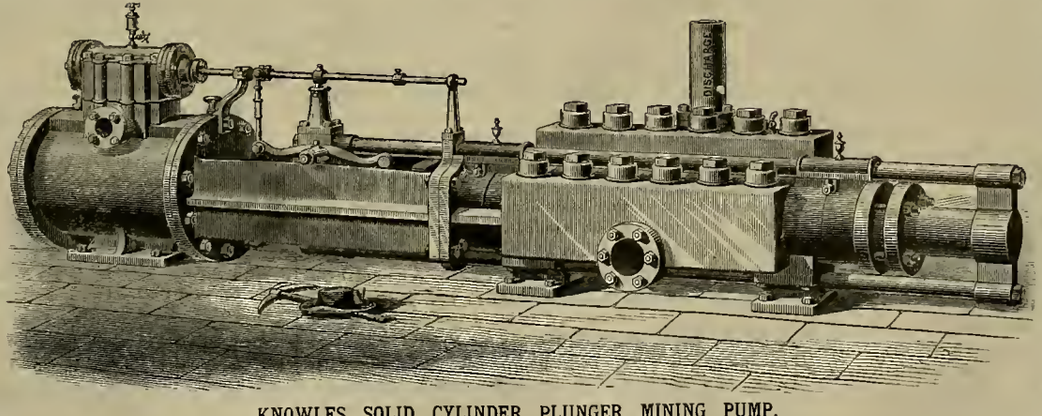
A special form of plunger mining pump is shown in the lower illustration on this page. It is the Knowles patent solid cylinder pattern, and is especially adapted for the heaviest work, and will pump in a single lift 1000 feet as well as one of 300 feet high. The heavy castings, absence of joints and pecnliar arrangement of valves and plungers, render this pump very durable. Practically, the only wearing point in the entire water end is the packing in the stuffing-boxes. It is provided with two hand-hole plates, so that the cylinder can readily he cleaned. These pumps have two single-acting plungers attached to strong cross-heads by heavy rods of wronght iron. These connecting rods are supported by and slide on adjustable guides or bearings, thus keeping the plungers in line and preventing uneven wear. The piston-rod does not enter the pump cylinder, and is therefore not exposed to the action of the mine water. The plungers have outside stuffing-boxes which can be readily packed, and, being in sight, any leakage of water through the glands can be quickly detected. The plnngers not passing through any sleeve or stuffing-hox in center of cylinder, but heing "outside connected," it is not possible for any water to leak hy or to pass from one end of the cylinder to the other; the displacement of water at each stroke is equal.

The vertical pump shown in the upper illustration is used for sinking new shafts, recovering old mines that have been "drowned out," and for mining operations reqniring the use of a light, portable and efficient steam pump, also for sinking wells and general excavation work. It ia easily handled, and can be placed in any position. Althongh designed to work vertically, it will also operate well when placed on an angle or horizontally. Being compact in design and strongly made, it will withstand rough usage. The pump requires hut little room in the shaft.

Each pump is arranged with a ring holt, firmly imbedded in the upper steam cylinder head, to which tackle for raising or lowering can he readily attached. Adjustable wrought-iron dogs, for hanging the pump to the shaft timbering, are bolted to the cylinders. The lower plnnger works in a removahle cylinder of gun-metal composition, which can be readily replaced hy a new one when worn out. The water valves are of vnlcanized rubber, and work on seats of gun-metal composition. Swing holts admit of easy access to the water-valves and pump-harrel. Parke & Lacy are agents for the Knowles pumps.



KNOWLES DOUBLE-ACTING SINKING PUMP.



KNOWLES SOLID CYLINDER PLUNGER MINING PUMP.

It develops that the United States Senate failed to confirm the Presidential appointment of the California Debris Commissioners, and, when the Senate adjourned, their term of service, while awaiting confirmation, technically expired. It will therefore be necessary for the President to reappoint the commission that it may be empowered to continue the work already done. This condition of things transpired at the meeting of the commission last Tuesday, at the hearing of applications for license by a number of mines in Plumas and Ynba counties. The hearing was held according to form, and Col. Mendell then stated that the commission must be reappointed before action could be taken. Secretary Ralaton, of the State Miners Association, afterwards telegraphed a statement of the circumstances to the Secretary of War, but at this writing (Thursday) no answer had been received. Failure to confirm the commission was unquestionably an oversight. The President will no doubt make the reappointments, as soon as his attention is called to the matter.

The activity in California mines at the present time is great, and the number of produciog mines is constantly growing. It is still a fact, however, that the list of non-producing mines is long, comprising a very considerable part of the total list in the State. These mines have been shut down from various causes. Some hydraulic mines have been worked out, more have been stopped by judicial decree. Some mines have been wrecked through incompetent management, others by differences between partners or stockholders. But very many have become idle because of the decrease in grade of the ore or increasing expense of mining or milling, or both. These latter bave been common occurrences for years. But now, with improvement in milling facilities, the greater relative value of gold, and the renewed activity of the industry, many of these non-producers ought to become producers. It costs less to mill than it used to. Better and higher results are attained. And it costs less to mine also than a few years ago. Labor is cheap. Implements, appliances, explosives, etc., are cheaper The inducements for taking up low-grade properties are greater than ever before. The opportunities should no longer be neglected.

It is a curious fact that silver is again advancing despite recent unfavorable legislation. At the time of passage of the repeal bill it dropped several cents in New York, and, to a lesser extent, in London. During the earlier days of this week, however, silver showed marked improvement in both markets. It is explained that the rise is due in part to the helief that the Government of Russia is contemplating the step of adopting silver as part of her monetary system. It is said that Russia will replace her uncovered paper money with silver, to be used for subsidiary coin. At present the amount of silver in use in Russia as money is not 53 cents per capita. Russia has $500,000,000 of uncovered paper, or about $4.42 per capita. It is stated that Russia can easily absorb $260,000,000 of silver and is desirous of doing so for the purpose of pushing her commerce in the East with Persia, India and China, which use silver almost exclnsively as money.

The outlook appears to indicate an advance in silver in the not remote future. The reasons are several: The United States will unquestionably become a large purchaser. Russia is helieved to be ready to absorb a large amount of the output. Lead and copper are certain to advance and offer encouragement for the resumption of lead and copper-silver mines. There are some high-grade silver mines which can be operated at a profit now, but they are not sufficient to supply the demands of the world. The result will certainly be an advance in price beyond the point where average ore may be profitably milled. International bimetallism is not an iridescent dream, though it looked that way not long since. Legislation has been shaping itself in that direction for some time.

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San Francisco, November 11, 1893.

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AN unknown and powerful explosive appears to be concealed within coal from a newly opened mine near Comox, British Columbia. Some weeks ago an explosion occurred aboard the steamship Barracouta, loaded with Comox coal. The mishap was attributed either to gas or dynamite. When the vessel discharged cargo here, every bucketful of coal was carefully inspected, with the result of ascertaining that none of the coal had been heated, thus disposing of the gas theory, and that none of the coal was shattered. This effectually combatted the dynamite theory. However, the presence of sulphur was discovered. Last week an explosion occurred aboard the steamship San Mateo, which loaded at the same mine, under exactly the same mysterious circumstances, with an equal amount of damage as the Barracouta's mishap. The coal had been in the hold less than 48 hours. Experts have been engaged to make examinations of the coal, with a view of connecting the sulphur with the cause of the explosion. This much is known: a secret, potent force exists in this coal not known to other coals of commerce. The problem to be solved is the discovery of the explosive agent, and the chemical process by which its destructive power is exerted.

THERE is no profession or calling that requires more technical knowledge and training than that of the mine superintendent, in order to enable him to follow his vocation to the greatest advantage. He should have a knowledge of all mineral ores and be capable of ascertaining the percentage of metal those ores contain, as well as a practical knowledge of the methods of working lodes and auriferous veins. He should be informed as to the construction of mining machinery, water races, dams and reservoirs. He should have a knowledge of rocks and formations where different minerals are likely to be found. Indeed, a thorough knowledge of mining requires many years of toil and study in both the technical and practical branches. As year by year passes, we find the necessity growing for men who are engaged in conducting large mining operations having a practical and technical knowledge of the branch they are engaged in. It is only through skilled superintendence that the mining industry will be placed on a more solid and commercial foundation, and give greater encouragement for the investment of capital to open up and develop our mineral wealth.

POLITICS develops surprising things. It is now declared that Voorhees, who was the Senate leader of the repeal forces, will introduce a free-coinage measure. It is well known that Voorhees was until very recently a silver man, and he declared during the Senate debates on repeal that "he is now no less a friend of silver than before." It is not likely, however, that the silver men will rely on Voorhees to champion their cause.

FRIDAY, Nov. 10.—The President has reappointed the Debris Commission.

The New Mining Bill.

The full text of the bill drafted by the special committee of the California Miners Association, appointed for that purpose by the late convention, is presented in this issue. Its provisions are of the utmost importance to all miners, and they should be carefully noted.

It is expected that this bill will be the embodiment of the desires and opinions of all the mining States, and a plan is on foot to present it to the representative mining men of the various States, with a view of securing their endorsement. To Mr. Chas. G. Yale has been delegated the duty of communicating with leading citizens in the various mining States and Territories—Montana, Colorado, Wyoming, Idaho, Oregon, Washington, Nevada, Utah, Arizona and New Mexico—with a view to securing the organization in these several States of a body similar to the California Miners Association. These organizations are to be requested to send delegates to a general convention to be held in San Francisco, where the interests of all are to be considered. If the bill is not fully satisfactory to all, an attempt will be made to expand its provisions so that it may be rendered satisfactory. The bill would then be presented at Washington backed by the sentiment of all the mining States.

The movement is most timely and important, and it is hoped it will be successful. It is hoped to get the delegates from the various States in San Francisco at a comparatively early date.

Low Mining and Milling Costs.

Taking for his text an article which recently appeared in the MINING AND SCIENTIFIC PRESS on the "Lowest Cost of Mining and Milling," Albert Williams Jr., whose experience has been largely in California, makes some very timely and instructive comment in the *Engineering Magazine*. He warns the reader that extremes are apt to be misleading because the circumstances are always exceptional, and that they are therefore no safe guide for undertakings of similar character under usual conditions. The mines and works which give the most economical results are the ones which have the best total average of favoring conditions, which, though indefinitely numerous in minor details, are, in the case of mines, grouped under these main heads: size, character and richness of deposit; scale of operations; ease of working, with reference to hardness or toughness of rock, amount of timbering needed, explosives, tools, or power drills, etc.; nature of openings, whether open cuts, shafts, inclines or adits; altitude and general surrounding topography; climate; presence of water; temperature at great depths; facilities for using water and electric power; available local supplies of timber, fuel, etc.; communications with points of supply and distribution, as to means, time and freight rates; character of labor; wages and cost of living; ruling market prices for all items of supplies and products; and, of course, skill in technical management and in business administration. It will be easily seen that under each of these and other principal heads a long list of minor details could be enumerated, all of which have more or less weight in the final result. At a large metallurgical establishment the complexity of influencing conditions is even greater, for while some of the mining conditions are dropped, a greater number of new ones are introduced. Then, again, taking a broader view, not only do the conditions at the mines and metallurgical plants mutually affect each other, but they are also themselves affected by a series of apparently outside influences, such as legislation, competition, state of the money market, progress in the manufacture of machinery, and so on indefinitely. The point of all this is that when one comes to figuring probable costs and results in any mining or metallurgical enterprise, the task is not as simple as might appear. The estimate never includes more than a part of all the factors; but whether the estimator is conscious or unconscious of their existence, they are all the same in the actual result.

Mr. Williams adds an instance or two of low costs, citing the famous North Bloomfield, where two cents per cubic yard—about one cent per ton—covered all expenses. But to estimate on this basis for an ordinary placer mine would be absurd. There are not so very many records of success where the gravel runs lower than ten cents per yard. Some mines of large deposits, with a plentiful and cheap water supply, ample dump room, and a fairly long working season, have paid well on lower than ten-cent gravel.

On the whole, Mr. Williams has excellently stated the conditions which go to make up the cost in mining. He might have added, however, that the devices employed to secure high results in phenomenal cases very often afford a suggestion which may find practical adaptation in other cases where the conditions are not all the same. Actual profit may be derived from a study of the experience of others, no matter what the circumstances.

Fruits and the Mines.

The attention of California producers has in recent years been so largely devoted to fruit culture that it has become the foremost State in the Union in almost every manner of fruit production. Deciduous fruits of all varieties find the highest excellence here, and citrus fruits are produced in great abundance. Prunes, grapes (table, raisin and wine), peaches, nectarines, apples, cherries, pears, apricots, plums, figs, olives, berries of all kinds, and a great many others too numerous to mention are included in the list which attain the most systematic and successful cultivation in California. There are some States which produce a greater abundance of particular fruits—Florida more oranges, many States more apples and pears—but in the mass of fruits California has no peer. It is safe to assert that the value of all its fruit products is several times greater than that of any other State; and the industry has by no means reached the limit of its growth.

California is the only State which is the largest producer of more than one variety of fruit. More prunes are raised here than in any other State; more peaches, more grapes, more olives, more figs, more nectarines, more apricots. The time will probably come when it will raise more oranges. It produces more wines than all others put together. Apricots, raisin grapes, figs and olives are raised in no other State.

California ranks high as a producer of wheat and barley, and exports perhaps a greater relative surplus than any other State. California is a large producer of wool, and one of the largest of hops. And so the list might be extended indefinitely. All these things are excellent, and go to make up a great commonwealth. All contribute to the wealth, prosperity and happiness of the people. May no branch of industry ever be diminished! May all grow to the maximum predicted by their most hopeful followers!

But it is not amiss to call attention to the fact that in all this development of fruit and other interests one other branch of industry has not been surpassed in value or importance. There is an impression in some quarters that the mining industry has been relegated to the background, and that its value is exceeded by the later and newer interests. It is true that the production of gold has been restricted in recent years, largely owing to the paralysis of hydraulic mining. But California produces many other minerals—silver, lead, quicksilver, borax, chrome, antimony, manganese, lime, marble, building stone, petroleum, asphaltum, bituminous rock, clays, coal, salt, alum, asbestos, bismuth, tin, cement, plumbago, gypsum, iron, infusorial earth, kaolin, metallic paint, mica, nickel, ochre, rock soap, slate, sulphur, talc and other substances. The chief product, however, is gold, of which in 1892 there was taken from the earth $12,571,000. The product of other minerals will swell the total output to $20,000,000 at a safe estimate. Now let us see what the producers of fruit (including wines) realized in 1892. The following figures are the result of a careful computation, and are gleaned from exact sources:

PRODUCTION IN 1892.

Citrus fruits (3485 carloads @ $360)*	$1,254,600
Prunes (28,000,000 lbs @ 5c)	1,680,000
Dried fruits (65,000,000 lbs @ 6c)	3,900,000
Raisins (53,000,000 lbs @ 4c)	2,120,000
Wines (12,000,000 gallons @ 16c)	1,920,000
Green deciduous fruits (5600 carloads @ $630)†	3,528,000
Canned fruits (1,600,000 cases @ $2)	3,200,000
Miscellaneous, fruits consumed at home, etc.	1,000,000
Total	$18,602,600

*On a basis of $1.50 per box for oranges.

†This is based on the average price received by shippers of 1694 carloads through the California Fruit Union and is the maximum. No separate account of the shipment of peaches, apricots, grapes, etc., was taken, and it cannot therefore be given. The large proportion was of course peaches.

It will thus be seen that the product of gold alone in California ($12,571,000) is larger than any three of these items combined, and the relative values of the fruit and mineral interests of California are therefore as follows for 1892:

Mines	$20,000,000
Fruits	18,602,600
Balance for mines	$ 1,397,400

The fruit industry is growing rapidly. So is the mining. The year 1893 has not been a very profitable fruit year; but it has for the mines. There is room, and plenty of it, for both industries in the State; but it is well enough not to lose sight of the fact that California proposes to retain its character as the chief producer of gold in the United States, having yielded more than twice as much as any other State in 1892. It will do better in 1893.

THE preparatory work for the mineral exhibit at the Midwinter Fair goes on apace. Contributions have been reasonably good enough to guarantee that the extensive plans mapped out by the committee can be carried out successfully. Materials for the various exhibits have been freely promised and it is safe to assume that no branch of the industry will be without representation. The committee is working diligently and it deserves success.

The Miners Association Bill.

At the recent convention of the State Miners Association, a committee was appointed to prepare for presentation to Congress a bill embodying the sentiment and action of the convention on several important matters affecting the interests of the miners. Hon. Tirey L. Ford, Judge Edward A. Belcher and Mr. Charles G. Yale were selected as the most competent to perform this service. They have been engaged for some time and have just completed their work, which is contained in the accompanying report to the Executive Committee of the association. It is proper to state that the bill is still subject to change. Following is the report, containing the text of the proposed bill:

To the President, Secretary and Members of the Executive Committee of the California Miners Association, GENTLEMEN:—The undersigned committee, appointed by the above-named association at its recent annual meeting, with instructions to draft a bill to be presented to Congress, embodying the wishes of said association as expressed at said annual meeting, concerning certain portions of the Revised Statutes relative to the acquisition of title to the mineral lands of the United States and the manner of holding the same, beg leave to submit the following:

An Act to amend Chapter VI of Title 32 of the Revised Statutes relating to mineral lands and mining resources.

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled, That section twenty-three hundred and twenty-four of the Revised Statutes be amended so as to read:

"SECTION 2324. The miners of each mining district may make regulations, not in conflict with the laws of the United States, or with the laws of the State or Territory in which the district is situated, governing the location, manner of recording, amount of work necessary to hold possession of a mining claim, subject to the following requirements: The location must be distinctly marked on the ground by posts or monuments, so that its boundaries can be readily traced. All records of mining claims hereafter made shall contain the name or names of the locators, the date of the location, and such a description of the claim or claims located by reference to some natural object or permanent monument as will identify the claim. On each claim located after the tenth day of May, eighteen hundred and seventy-two, and until payment of the purchase money and a certificate of entry has been issued therefor, not less than one hundred dollars' worth of labor shall be performed or improvements made during each year. On all claims located prior to the tenth day of May, eighteen hundred and seventy-two, ten dollars' worth of labor shall be performed or improvements made during each year for each one hundred feet in length along the vein, until payment of the purchase money and a certificate of entry has been issued therefor; but where such claims are held in common such expenditure may be made upon any one claim. That the period within which the work required to be done annually on mineral claims shall commence at 12 o'clock meridian on the first day of January succeeding the date of location of such claim. When the labor required by this act shall have been performed or the improvements made, an affidavit may be filed within thirty days after the time limited for performing such labor or making such improvements with the Recorder of Deeds of the county in which the claim or mine is situated, particularly describing the labor performed and improvements made, and the value thereof, which affidavit shall be prima facie evidence of the facts therein stated. And upon a failure to comply with the conditions of this act in the performance of labor or making of improvements, the claim or mine upon which such failure occurred shall be open to relocation in the same manner as if no location of the same had ever been made: Provided, That the original locators, their heirs, assigns or legal representatives do not resume work upon the claim after such failure and before such relocation, and continue the same with reasonable diligence until the required amount of labor shall have been performed or improvements made. Upon the failure of any one of several co-owners to contribute his proportion of the expenditures required hereby, the co-owners who have performed the labor or made the improvements may, at the expiration of the year, give such delinquent co-owner personal notice in writing or notice by publication in the newspaper published nearest the claim, for at least once a week for ninety days, and if at the expiration of ninety days after such notice in writing, or by publication, such delinquent shall fail or refuse to contribute his proportion of the expenditure required by this section, his interest in the claim shall become the property of his co-owners who have made the required expenditures. A copy of such notice, together with an affidavit showing personal service or publication, as the case may be, of such notice, when filed and recorded with the Recorder of Deeds of the county in which such mining claim is situated, shall be evidence of the acquisition of title of such co-owners. Where a person or company has or may run a tunnel for the purpose of developing a claim or claims owned by said person or company, the money so expended in running said tunnel shall be taken and considered as expended on said claim or claims: Provided further, That said claim or claims shall be distinctly marked on the surface as provided in this act."

SEC. 3. That section twenty-three hundred and thirty-four of the Revised Statutes be amended by adding thereto the following:

"And the surveyors appointed under the provisions of this section shall have power to administer oaths to their assistants."

SEC. 4. That section twenty-three hundred and thirty-five of the Revised Statutes be amended so as to read:

"SEC. 2335. All affidavits required to be made under this chapter may be verified before any officer authorized to administer oaths within the State or Territory where the claims may be situated, having an official seal, and all testimony and proofs may be taken before any such officer, and, when duly certified by the officer taking the same attested by his seal of office, shall have the same force and effect as if taken before the register and receiver of the Land Office. In cases of contest as to the mineral or agricultural character of land, the testimony and proofs may be taken as herein provided on personal notice of at least ten days to the opposing party, or, if such party cannot be found, then by publication of at least once a week for thirty days in a newspaper to be designated by the Register of the Land Office as published nearest to the location of such land, and the Register shall require proof that such notice has been given: Provided, That the presence of rock in place bearing gold, silver, cinnabar, petroleum or other valuable mineral shall be regarded as presumptive evidence that the land containing the same is, and always has been, mineral in character: And provided further, That in investigating the character of land with a view to ascertain whether it is more valuable for mineral than agriculture, evidence may be taken of the mineral discovered or developed adjacent to such land, proof of which shall be presumptive evidence that the land in question is, and always has been, mineral in character: And provided further, That wherever land is proven to be within a well defined mineral belt, such land shall be deemed, presumed and taken to be, and always to have been, mineral land, unless the contrary is proven: And provided further, That the provisions of this chapter shall be liberally construed with a view to aid the applicant in procuring title to the mineral lands of the United States, and the rules and regulations prescribed by the Land Department for its government and that of its officers, in disposing of said lands, shall be so formulated and administered as to assist the Government in disposing of said lands to *bona fide* applicants, and not so as to impede the sale thereof or impose onerous burdens upon applicants."

SEC. 5. That section twenty-three hundred and thirty-seven of the Revised Statutes be amended so as to read:

"SEC. 2337. Where non-mineral land not included in a lode claim is used or occupied, or is intended to be used or occupied, by the proprietor of such vein or lode claim for mining or milling purposes, such non-mineral surface ground may be embraced and included in an application for a patent for such vein or lode claim, and the same may be patented therewith or separately subject to the same preliminary requirements as to survey and notice as are applicable to vein or lode claims; but no location hereafter made of such non-mineral land shall exceed ten acres, and payment for the same must be made at the same rate as fixed by this chapter for the superficies of the lode claim. The owner of a quartz mill or reduction works, not owning a mine in connection therewith, may also receive a patent for his millsite as provided in this section."

Said committee desires to further state that, while the foregoing is believed to embody all the changes recommended by said association and most urgently desired by mineral claimants, the time is rapidly approaching when an entire revision of our Federal mining code will be desirable, and we would suggest that, when convenient, your honorable body take some appropriate steps in that direction. Respectfully submitted,

TIREY L. FORD, Chairman,
E. A. BELCHER,
CHAS. G. YALE, Committee.

Suspension of Assessment Work for 1893.

Through the courtesy of Senator Perkins the text of the bill suspending for the year 1893 the operation of the statute requiring $100 annual assessment work on unpatented mining claims has been received by the MINING AND SCIENTIFIC PRESS. The bill is brief and its provisions are plain. One feature of it should not be overlooked by miners. In order to secure the benefits of the act, it is necessary to place on record before December 31, 1893, a notice that the owner intends in good faith to hold and work his claim. The text of the law is as follows:

An Act to amend section numbered twenty-three hundred and twenty-four of the Revised Statutes of the United States, relating to mining claims.

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled, That the provisions of section numbered twenty-three hundred and twenty-four of the Revised Statutes of the United States, which require that on each claim located after the tenth day of May, eighteen hundred and seventy-two, and until patent has been issued therefor, not less than one hundred dollars' worth of labor shall be performed or improvements made during each year, be suspended for the year eighteen hundred and ninety-three so that no claim which has been regularly located and recorded as required by by the local laws and mining regulations shall be subject to forfeiture for non-performance of the annual assessment for the year eighteen hundred and ninety-three: *Provided*, That the claimant or claimants of any mining location, in order to secure the benefits of this act, shall cause to be recorded in the office where the location notice or certificate is filed on or before December thirty-first, eighteen hundred and ninety-three, a notice that he or they, in good faith intend to hold and work said claim: *Provided, however*, that the provisions of this act shall not apply to the State of South Dakota. This act shall take effect from and after its passage.

THE people of Spokane, Wash., are taking energetic measures toward making a creditable exhibit at the Midwinter Fair. The intention is not only to show minerals, but other resources and manufactures. The product of the mines, however, will be the principal feature. The Cœur d'Alene and other mine-owners and the railroads have given assurance of their substantial aid.

A Case of Valley Misrepresentation.

The Sutter *Independent*, whose gospel is the utterances of the Anti-Debris Association, says there is no valley prejudice against hydraulic mines, or miners as such, and complains that the anti-debris people have been misrepresented by this paper and by others. It is no doubt true that there is not so much prejudice as there was. That is the reason why the Anti-Debris Association is losing its grip. But that there was and is prejudice will scarcely be disputed by fair-minded persons. A signal instance, both of prejudice and misrepresentation, relative to the question as to whether restraining dams will restrain, is recalled. It is pertinent in this connection, because the *Independent* makes this subject the partial basis of its tirade against this paper, and says they will not restrain. An important valley convention met on June 10th of last year, at Sacramento, and passed resolutions defining their position on the restraining-works question, and to sustain their position quoted from the official report of the Government engineers, deliberately omitting the part italicized:

"These dams, however, will not be effective in impounding all the material delivered into the canyons from the mines. Being in the streams and in the pathway of the freshets, portions of the heavier material will be carried over the crests of the dams to eventually find lodgment in the river below. The finer sand and clay cannot be effectually impounded by such barriers, but will be carried off in suspension. *With the improved condition which it is desired to give to the navigable rivers, it is probable that the greater part of this fine material can be carried off without being productive of harm.*"

The concluding sentence is the essence of the paragraph. It cannot be pleaded that it was omitted for any other purpose but to give only a partial view of the situation. It was unfair, discreditable and dishonest. The miners have never been driven to the necessity of mangling and misquoting official utterances in order to bolster up their position.

The Noble Decison.

TO THE EDITOR:—Referring to B. M. Newcomb's letter in the PRESS of October 14th, on the Noble ruling, I wish to say that the Bigelow lodes were located from a shaft by *two locators*. If each of these persons, drifting off on his claim 100 feet on a ledge all the way, had put his initial monument over the river end of his drift, and claimed that distance back to the shaft, would Mr. Noble, in that case, have cancelled the patents on the ground of their being but one discovery?

Were not five feet of the lode, exposed in the shaft and divided, just as good under the mining law for the making of two locations, as 100 feet of the same vein would have been? What right has the Secretary of the Interior to decide how little or how much of an exposed lode is to be considered a discovery?

I tried to show in my letter of September 23d that the mere finding of a hunch of ore does not constitute a discovery until it has been proved that a vein exists there, and that it is on unclaimed land. The real discovery is the lode traced out for the length of a claim and appropriated. When a sailor sees a mast above the level of the sea he has discovered a submerged ship, and not solely a piece of Oregon pine. What promises to be a mine is a discovery.

Before Mr. Bigelow's patents were cancelled it was the duty of Mr. Noble to show conclusively that there was no evidence whatever of there being a lode anywhere within the 3000 feet of ground claimed.

But the Secretary admitted that there was enough mineral in the shaft to constitute a discovery for one claim. Why, then, did he cancel both patents? One of them, according to his own dictum, was a valid location, and yet he declared it invalid. Could that be the act of a wise or a just man?

I do not know whether Mr. Bigelow's claims crop out at several places or nowhere but at the original shaft, nor, in one sense do I care, for I am not purposely fighting his battle, though to identify the case I have been compelled to use his name. I am fighting the conceited ignorance of the Interior Department as represented by a Secretary who assumed that he knew a great deal more about the locating of mineral lodes than was known by experienced miners.

As I have hinted that Mr. Bigelow has no guiding lines over me, so to those who may suppose that I am attacking Mr. Noble on political grounds, I will say that they are mistaken, for I am a Republican. I am glad Mr. Newcomb tempted me to write this second epistle on Mr. Noble's ignoble decision. JOHN DARE EMERSLEY.

Dos Cabezas, Ariz., Nov. 3, 1893.

Blank Applications to Mine.

Appended is the blank form of application to mine by the hydraulic process adopted hy the California Debris Commission. Copies will he furnished, on application, to persons desiring to mine:

To the California Debris Commission, Room 92 Flood Building, San Francisco, Cal.

The undersigned, being the proprietor.. of the mine mentioned, hereby petition.. for authority to work by the "hydraulic process" the mine described below.

Name of mine.....

Where situated.....

Names of claims composing the property.....

Area proposed to work by the hydraulic process.....

Height of bank to be worked.....

Character of material, loose or cemented.....

Estimated to consist of.....per cent bowlders,.....per cent cobblestones,.....per cent gravel,.....per cent sand,.....per cent loam or pipe clay.

Mine drains into.....creek, which reaches .....river.

Source of water supply.....

Length of ditch....., width....., depth.....

Grade of ditch.....

If there is a water reservoir, describe it.....

.....inches of water used, for.....hours per day, for ..... months in the year.

Pressure of water used.....

Sluice is.....feet wide,.....feet deep, with grade of..... in twelve feet.

Cubic yards of gravel to be worked in an hour.....

Character and location of barriers, existing or proposed, to restrain debris (describe in detail).....

Area of reservoir for holding debris.....

Capacity of proposed reservoir in cubic yards.....

Is it a watercourse or worked-out pit?.....

What is the drainage area above the site, in case the reservoir is a watercourse?.....

Grade of bottom of reservoir, ...feet per hundred feet.

Area of ground draining into impounding reservoir in case it is not in a watercourse.....

Average annual rainfall, if known.....

Rainfall during heaviest storms.....

Deepest snow known (on level).....

Width and average depth of stream at reservoir site during highest known flood.....

NOTE.—Where above information cannot he accurately stated, give estimated amount and indicate that it is estimated.

Enclosed herewith are the following maps, plans, sketches, etc.:

1. Map showing claims, proposed workings, and part already worked.
2. Map showing impounding reservoir.
3. Section of proposed dam or barrier. Longitudinal section of reservoir. Cross sections of reservoir.

NOTE.—The above maps are necessary for important mines and desirable in all cases. The cross sections should be 200 to 500 feet apart, and taken at the widest and narrowest places. For small mines sketch maps may suffice, but for important mines these maps should be made hy an experienced engineer and should show the contours of the impounding reservoir so that its contents can he accurately computed. Each map should hear the name of the mine and show who made it.

Names of mines whose owners are entitled to use proposed reservoir and whose petitions are submitted with this one, constituting a joint petition.....

Names of mines which drain into the same reservoir and which are not entitled to use it.....

Route to mine.....

Name of person to whom communications concerning mine should be sent.....

Postoffice address.....

Remarks.....

In accordance with Section 10 of the Act creating the California Debris Commission the right and privilege is hereby surrendered to the United States to regulate by law, as provided in the Act, or hy any law that may hereafter be enacted, or by such rules and regulations as may be prescribed by virtue thereof, the manner and method in which the debris resulting from the working of said mine shall be restrained, and what amount of debris shall be produced therefrom; it being understood that the surrender aforesaid shall not be construed as in any way affecting the right of the owners to operate said mine by any other process or method now in use in the State of California.

..... [SEAL.] .....[SEAL.]

STATE OF CALIFORNIA,
County of ..... } ss.

Personally appeared before me, ... the petitioner.., named in the foregoing petition, who, being duly sworn according to law, depose.. and say.. that ..... the person.. named in the foregoing petition, that ..be.. know.. the contents thereof, and that the statements made therein are true to the best of ..b.... knowledge and belief, and that ..he.....the person.. who executed the above surrender.

Sworn and subscribed to this..... day of....., 189.. }

Before me, ...

Notary Public.

NOTE.—In case of an incorporated company the petition may he submitted hy its attorney in fact, or other duly authorized agent, legal evidence of which authority must he filed with the petition.

Points for Assayers.

Written for the MINING AND SCIENTIFIC PRESS by C. H. Aaron.

It often happens that an assayer in these Pacific States and Territories is asked to report an assay of gold or silver ore in terms of Spanish weights, for the accommodation of a Spanish-American patron. Gold and silver are required in *onzas por tonelada*, silver in *marcos por tonelada*, or *marcos por carga*.

The *onza* is different from our troy ounce, and the *tonelada* is not quite the same as our ton, although it contains 2000 Spanish pounds, or *libras*, each containing 16 *onzas*, or 2 *marcos*.

The American assay report, in troy ounces per ton, is converted, almost accurately, into *onzas* per *tonelada* hy the addition of 10 per cent to the number of ounces. This is easily shown, as follows:

A ton contains 29,166.66+ troy ounces, hence an ore containing 1 per cent of silver contains 291.66+ ounces. A *tonelada* contains 32,000 *onzas*, hence 1 per cent is 320 *onzas*. Now, 291.67+1 per cent=320.83, that is to say, the error is only .83 *onza* in 320 *onzas*, which is less than the probable variation of assays in silver ore of that grade of richness. It is not often that we have so many ounces of gold in a ton of ore, and in ordinary gold ore the error would not he serious. For instance, in ore containing 2 917 onnces of gold to the ton, we get by this rule, at the most, 3.209, or .09 *onza* too high.

If we take four grammes of ore for the assay, each milligramme of metal obtained is equivalent to 1 *marco* in the *tonelada*, as will be seen from the fact that 4 grammes contain 4000 milligrammes, and one *tonelada* contains 4000 *onzas*, so that the stated weight of ore is an assay *tonelada* in which the *points* of bead weight equal the *marcos* required, which are converted into *onzas* when multiplied by 8. From this it follows that if we take 32 grammes of ore, we have an assay *tonelada* in which each milligramme represents 1 *onza*.

In Mexico, the *carga* (mule-load) contains 300 *libras*, or three-twentieths of a *tonelada*, hence if we multiply the *marcos* or *onzas* of gold or silver found in the *tonelada* hy 3, and divide by 20, we have the *marcos* or *onzas* in a Mexican *carga*. In Honduras a *carga* consists of only 200 *libras*, or one-tenth *tonelada*, so that we need only divide the value of a *tonelada* hy 10 to obtain that of a *carga*.

The *libra* and our pound are not quite equal, hut for moderate weights and general purposes they have been accepted as such in my experience of Central America.

C. H. AARON.

Correction.

TO THE EDITOR:—An error, probably clerical, found its way into my "Point for Millmen" in your issue of November 4th. In the arithmetical rule it is directed to "divide the lesser remainder by the greater." The reverse was intended, as shown in the example, viz., *divide the greater remainder by the lesser, etc.* I will take this occasion to remark that, in formulating the rule, I am supposing the headings to he richer and less in quantity than the tailings, as must he the case where effective concentration has been done. The rule is:

RULE.—*From the assay value per ton of ore and of headings, respectively, subtract the assay value per ton of tailings; divide the greater remainder by the lesser; the quotient is the answer sought.* C. H. AARON.

THE organization of the California State Mining Exhibit Committee is as follows:

President—J. J. Crawford.

Secretary—W. C. Ralston.

Executive Committee—S. K. Thornton, S. B. Christy, Frank McLaughlin.

Advisory Committee—R. McMurray, W. S. Chapman, Thos. Boysen, Chas. G. Yale, W. W. Stow, H. Pichoir, John Daggett, J A. Clark, John Baliard, Tirey L. Ford, Niles Searls, A. J. Ralston, Wm. Clift.

Finance Committee—Edward Coleman, Geo. T. Marye, Felix Chappellet, Adolph Hirschman, Martin Jones, M. W. Belshaw, Chas. W. Randall, Samuel J. Hendy, Dan T. Cole, J. E. Doolittle, Geo. R. Wells, W. E. Deane.

Mr. F. A. Winchell.

Mr. F. A. Winchell, for a number of years prominently connected with the Crane Company of Chicago as auditor, has associated himself with the New York Belting & Packing Company, Ltd., 13 Park Row, New York City, as manager of sales department. Mr. Winchell is a gentleman of genial disposition and is possessed of rare executive and business ability. He is popularly known in the machinery trade, where he has acquired a host of friends, and the acquisition to the New York Belting & Packing Company, Ltd., in his connection with that well-known house, is one upon which it is to he congratulated.

Slickens.

THE Gold Eagle mine at Alherni, B. C., has been bonded for $50,000, and a contract entered into for 600 feet of tunneling.

SENATOR JONES, of Nevada, and ex-Senator Mahone, of Virginia, are said to have bought the Montgomery gold mine near Concord, N. C.

THE hoisting works of the Harmony mine, Nevada City, were burned Wednesday morning at 5 o'clock. The machinery was not damaged, and will he running again in a day or two.

REPRESENTATIVE GEARY has succeeded in getting the War Department to order a survey of the Sacramento river from Red Bluff to Redding, for the purpose of making estimates for contemplated improvements.

IT is said that another gold field has been discovered in Elko county, Nev., which rivals the Bruneau placers in richness. It is located on Van Duzer creek, near Mountain City, and it is said that from 25 to 50 cents per pan are secured.

THE Young American Mining Company has been incorporated. Principal place of business, San Francisco. Capital stock, $1,000,000, with G. A. Falkenstein, S. Kline, James Hoffman, John Blnett and W. H. Russell of San Francisco as directors.

A RICH LEDGE has been struck in the North Pole gold mine, Baker City, Or., in a tunnel 968 feet, at a vein depth of 400 feet. A 20-stamp mill is being put in. The ore will be worked hy the McArthur-Forrest or cyanide process, and tests made on ores from that section most satisfactory results were obtained.

THE Normandie Gold Mining Company has been incorporated. Principal place of business, San Francisco. Capital stock, $10,000,000, of which $500 has been subscribed, with Thomas Cole and John A. Hammersmith of San Francisco, W. C. Ralston and Charles G. Yale of Oakland and Wm. Bowers of Alameda as directors.

IT is reported that the Cassair placer mines, Alaska, are about worked out. There are mountains of quartz near the Highland river, which, if they turn out as expected, will afford plenty of mining. A number of Cassair miners will next year prospect in the country west of Cassair, near the Yukon river, about 500 miles distant from the Yukon mines.

THE Hancock Gold Mining Company recently organized at Sutter creek, Amador county, has purchased and will develop the Hancock gold mine in Calaveras county, for 17 years owned hy C. O. Mitchell. Enough work has been done to show that the property is a good one. Superintendent Parks, of the Kennedy mine, recommends it as an "exceptionally good place for a good paying mine.

SUPT. DAGGETT has made several more appointments to the working staff of the Mint. The list of fortunate ones is as follows: J. M. Sullivan, foreman whitener; Michael Mead, second assistant coiner; Charles Wanghman, Sonoma, workman in coiner's department; Miss S. Leary, San Francisco, adjuster; Mrs. E. Murdock, San Francisco, adjuster; Mrs. R. Dennison, San Francisco, janitress.

A PARAGRAPH has been going the rounds of the newspapers crediting Mr. Edison with the statement that he could make diamonds, rubies and other precious stones very cheaply. The statement has attracted much attention, and a San Franciscan wrote the great inventor a letter asking about it. He has received a reply from Mr. Edison, in which he says that, though a very good quality of precious stone is now being produced artificially, the market price of the genuine article has not been affected.

THE Sunset Gold Mining and Milling Company have bought the old Vanderbilt mine in Mariposa county, paying therefor $100,000. The mine, although a part of the Starr estate, was worked for years hy the Vanderbilt Company. Owing, however, to disagreements among the members, ending in numerous lawsuits, the mine reverted to the original estate and has not been worked for three years. The Sunset Company was incorporated on the 31st of October and has a capital stock of $400,000, of which $360,000 has already been subscribed. The incorporators are ex-Mayor McWeber of Oakland, A. H. Elliott, Pratt & Dunn and George Behee.

FOR several days following November 1st, there was no work in the New Vancouver colliery, at Nanaimo, B. C., the agreement between the management and the miners in regard to a 20 per cent reduction in wages having terminated the first of the month. Last Monday a new proposition was laid before the men hy the management to the effect that for the next six months the reduction in wages should be 10 in place of 20 per cent on condition of the men abiding strictly hy the terms of the former agreement of the company with the union. The miners held a stormy meeting, about 1000 being present, and the discussion lasted all day. Finally a vote was taken with the result that the men decided by a majority of 183 votes to return to work on the new terms. The East Wellington colliery is closed, the management having refused to meet the miners' demands.

THE editor of the Petalnma *Imprint*, Mr. W. A. Selkirk, who knows a good deal about mining in California, has faith in "greenhorn" prospectors. Mr. Selkirk declares that "it is an indisputable fact that from the earliest days down to the present time in the mining regions of California a large majority—probably nine-tenths—of the new discoveries have been made hy "greenhorns." Mr. Selkirk says the chief trouble with old and experienced miners is that they think they know where gold is not to he found, and they will not hunt in such places. But along comes the greenhorn, who hunts for it everywhere, and succeeds in finding it where its presence was deemed most impossible or improbable." There is some truth in what Mr. Selkirk says; but it may safely he assumed that if he were asked to "grub-stake" a prospector he would take chances on an experienced rather than a green man every time.

Foundry Note.

The Vulcan Iron Works have shipped this week a five-stamp mill—made sectional for mule transportation—to Siskiyou county, California. Also one of their Bull donkey engines to Dolbeer & Carson, Eureka. This donkey engine is used in connection with the new method of logging hy wire rope, hy which the hull teams are done away with altogether, and the logging done at considerably reduced cost.

Desquamation and Decay of Rocks and the Formation of Bowlders.

IN THREE PARTS—PART I.

Written for the MINING AND SCIENTIFIC PRESS by Henry G. Hanks, F. G. S. A., F. G. S., ex-State Mineralogist.

A person of average intelligence meeting for the first time with a large quantity of rounded stones (bowlders), every one of pure quartz, neither mixed with nor accompanied by any other mineral, would at first express surprise, then would naturally begin to theorize. Taking a common sense view, he would be likely to assert that they could not possibly have been created as found, but must have been brought from a distance and collected together by some unknown power.

To show this is the natural sequence in the human mind, I have only to quote from authors who have written on this subject, selecting a few from many. Scientific literature of a century ago, more or less, was replete with references to this subject. Among numerous authors I may mention the following as being perhaps the most prominent: Bakewell, Breislak, Buckland, Burnett, D'Argenville, De Luc, Dolomieu, Douglass, Faujas de St. Fond, Ferber, Hamilton, Hutton, Jameson, Kirwan, Knight, McCulloch, Murray, Pallas, Parkinson, Pinkerton, Playfair, Sanssure, Spallanzanni, Ure, Werner, Woodward, Whitehurst, Whiston and others. Ancient authors have also recorded this idea.

Having given much attention to the works of these and other writers of that period, I have learned to admire and respect them, and have been surprised to learn that many of our generally supposed modern ideas and theories were published and argued before the present generation was born, and that the works of some of our most noted authors might have been borrowed, if they were not, from the writings of geologists of past ages.

Investigations of the same subject in any age may lead to the same conclusions. It must be admitted that many modern inventions were known to the ancients, although new to the present generation, or at least to those not familiar with ancient writings.

Dr. Woodward (Fossils of All Kinds, etc., London, 1728) calls bowlders "globuli lapidei," and says: "They are found on the shores of the sea and rivers; they are lumps or fragments of stone or marble broken from the adjacent cliffs and rounded by being bowled and tumbled to and again by the action of the waters, whence they obtained the name of 'bowlder stones,' they being formed by an action like that of a bowl, and thereby reduced to the shape of one."

Theophrastus refers to a belief prevalent in his time that stones reproduced themselves. "The greatest and most wonderful of all the qualities of stones is that (if the accounts of it are true) of them which bring forth young" (History of Stones, XI). Mucianus, Democritus, Savonarola and Cardan have expressed a similar opinion.

There is in France a remarkable deposit of bowlders or large pebbles frequently referred to by writers both ancient and modern. It is in the department of Bouches du Rhone (formerly Provence). The modern name is "La Crau," the ancient one, "Campus Lapideus;" it is nearly level and is strewed with stones. Pliny (Book 3 Chap. 5) refers to it as the "stony plains" "remarkable for the battle of Hercules," and Strabo, thus: "Between Marseilles and the mouth of the Rhone, there is a circular plain about 100 stadia from the sea, and about 100 stadia" (about 11.4 miles) "in diameter. It has received the name of 'the stony plain' from the circumstance of its being covered with stones the size of the fist. * * * Aristotle tells us that stones being cast up by the earthquake designated *brostai*, and falling on the surface of the earth, rolled into the hollow places of the district; but Posidonius, that the place was formerly a lake, which, being congealed during violent agitation, became divided into innumerable stones like river pebbles or stones by the seashore, which they resemble both as to smoothness and appearance. * * * Æschylus, having learnt of the difficulty of accounting for it (having been informed by another), explained it away by a myth. He makes Prometheus utter the following, whilst directing Hercules the road from the Causassus to the Hesperides: 'There you will come to the undaunted army of the Ligurians, when, resistless as you may be, sure am I that you will not worst them in battle, for it is fated that there your darts will fail you, nor will you be able to take up a stone from the ground, since the country consists of a soft mold; but Jupiter, beholding your distress, will compassionate you, and, overshadowing the earth with a cloud, he will cause it to hail round stones, which you, hurling against the Ligurian army, will soon put them to flight.'"

The latter part of the above quotation is from "Prometheus Loosed," one of the lost tragedies. Mela relates that Hercules engaged in a fierce combat with Albion and Geryon, sons of Neptune, near the mouth of the Rhone, called upon Jove, his father, for assistance, who caused a shower of stones to fall which destroyed his antagonists.

The Rev. William Buckland in 1824 published an elaborate work (*Reliquæ Diluvianæ*) to prove geologically the flood of Noah—a remarkable work, considering the time when it was written—in which he displays profound knowledge of geological facts. I am indebted to his work for much information as to the knowledge possessed by geologists of his time. He believed that the deluge was the last great convulsion that had effected the surface of the earth, and it was his opinion that the bowlders and gravel were the result of that grand catastrophe. The following is a quotation: "As I have frequent occasion to make use of the word 'diluvium,' it might be necessary to premise that I apply it to those general deposits of superficial loam and gravel which appear to have been produced by the last great convulsion that has affected our planet, and entirely concede with Cuvier in considering them as being undeniable evidence of a recent and transient inundation." (*Folio* 2.) While I differ with him in opinion, I find the results of his observations and this record of them of great interest, and they have, in nearly all cases, been verified by my own. I take his facts and draw from them different conclusions, as some of my readers will very likely do from mine.

In summing up facts to prove a universal deluge, he refers to "the nature of the gravels, being in part composed of the wreck of the neighboring hills and partly of blocks that have been fragments and blocks transported from very distant regions;" and he states "the total impossibility of referring any one of these appearances to the effect of ancient or modern rivers or any other causes that are now, or appear ever to have been, in action since the retreat of diluvian waters." (*Folio* 227.)

This author noticed (*folio* 186) in bowlder deposits, occupying a large portion of the surface of Great Britain, three varieties of drift—gravel, sand and clay—the whole without horizontal division into beds and strata, with large and small bowlder stones mixed irregularly through every part of it. In some places it attained the thickness of 160 feet. Besides bowlder stones, it contained gravel, *i. e.* rounded fragments of almost any kind of rock and angular fragments of the adjacent rocks which are often of a softer nature than those which have been rolled to pebbles. A better description of the auriferous gravels of California could hardly be written.

John Miers (*Travels in Chili and La Plata, London*, 1826, *Vol.* 1, *fol.* 287), on his journey from Mendoza to Santiago, found the plains of Uspallata strewn with large rounded stones, the interstices between which were filled with alluvial sand. Those in the lower part were of uneven size and the upper were smaller. In the valley of Las Cuevas the same formation was met with. "A question naturally arises, Whence came so immense a congregation of stones, so large, and all rounded and water-worn? Certainly they could not have been deposited by the action of the present stream. It is an improbable conjecture that a large lake once filled the plain of Uspallata; that rivers of infinitely greater flow once poured into it from the valley of Las Cuevas, to whose ravishing torrents we owe the rupture and attrition as well as the congregation of this vast accumulation of rounded stones."

John Hill, in a note to his translation of Theophrastus' History of Stones, 1746, expresses the opinion that all pebbles and bowlders were formed in the waters of the deluge, and that they all had a nucleus or nodular center about which they were formed by concretion, like a pearl in the shell of an oyster.

Saussure (*Voyages dans les Alpes*, 1803, 717) thus refers to the existence of bowlders (*cailloux roules*): "In the upper parts of valleys, surrounded by high mountains, no bowlders are found which are foreign to the valley itself in which they are met with. On the plains, on the contrary, and at the opening of valleys which adjoin the plains, and even some way up the sides of the mountains which border on these plains, pebbles and blocks are found which might be said to have fallen from the skies, so different is their nature from anything found in the neighborhood."

Ignatius Donnelly (*Ragnarock, The Age of Fire and Gravel*, 1883) attempts to prove that the bowlders were showered down from the tail of a comet. "It is to the comet we must look for the source of a great part of those vast deposits which go to constitute the drift." (*Fol.* 78.)

The more I have considered this subject the less I am inclined to believe that the so-called drift is the result of sudden and violent energy. The change of rock fragments to sand and silt can be traced in continuation.

The idea of a single and universal deluge seems to have originated with a people (the Assyrians) who knew nothing of geology, in an age when the known world was a small circle including the Mediterranean, and the ideas then formed became engrafted on religion; geologists assumed the deluge and molded their theories to suit it.

While the world generally for many years, perhaps centuries, regarded bowlders and gravel as the work of some geological or astronomical cataclysm or catastrophy, a few especially keen observers began to notice that bowlder-making was rather the result of a law, the tardy effect of which was to form bowlders, gravel, sand and soil from rock masses without the necessary intervention of cataclysmal forces. A continued study of this subject, one geologist taking it up where another left off, resulted in establishing the fact that a long-hidden law existed upon the operation of which all animal and plant life depends.

Some years ago I discovered this law myself. I had not at that time any knowledge that others had written on the subject. I worked out the theory and published the result of my observations and conclusions in this journal in 1890, in some papers entitled "The Deep Gold Placers of California."

The more this subject is studied the more important it must be admitted to be. Not only does the operation of this law set our gold free in California, and form our placers, but it produces fertile soil upon which teeming millions of human beings, as well as other animals, actually subsist. Having produced the soil which animals and vegetables exhaust, it continues to renew the fertility. Without the existence of this law all organic life on this earth would soon cease. This being admitted, there will be more incentive to study this beautiful system so essential to our comfort, happiness and even existence.

What a Good Prospector Needs.

TO THE EDITOR:—It is a well-known fact to all practical prospectors and miners that the conditions under which gold exists in the different districts on the coast differ so widely that it is absolutely necessary for a person to have some experience in several different districts in order to become proficient in the calling. The change in the formation and in other features is so great sometimes within the distance of a few miles that a miner or prospector who may be competent and successful in one district would find that his knowledge obtained in that locality would avail him but little in the other. Even in different districts situated any great distance apart, where the same formation and geological conditions exist in both, the conditions under which the gold and other minerals are found in paying quantities are so different that it awakens the miner and prospector to the fact that he must make a special study of each and every locality where he prospects, for a rule that may hold good in two or three different districts will fail in another. For instance, on the slate belt, iron in a certain form will be found accompanying the pay chute, or in contact with it in some localities, while in another district, in the same class of slate, the iron will exist in another form in contact or in connection with the pay chute, or be absent altogether, *i. e.*, in large quantities. What is a sure indication of a pay chute or pocket in one locality may indicate barren rock in another, and the miner or prospector who has become thoroughly versed in one section must not allow himself to be carried away with the idea that he is master of the study, for, if he does, he will find to his disappointment that he knows but comparatively little when he comes to travel around and gain knowledge by experience in other districts. Life is too short for any man to become perfect even in any one branch of mining. In the same class of slate in which some of the best paying mines in Placer and El Dorado counties exist and are prolific in gold (especially the "hard iron" variety of slate), in the northern portion of the State through Siskiyon, Trinity and Del Norte counties it is almost barren of gold-bearing veins. And thus all formations will be found to differ in their production in different localities.

The gold-bearing veins in the State, through Placer county as a general rule, are small but rich, similar to those in the Grass Valley districts, but differ somewhat in the condition in which they hold the gold. The gold exists in most of the veins here in the form of pockets, while in the Grass Valley districts the ledges carry the pay more regularly in the form of long chutes. The Ophir district, which is principally in granite, although of a pocketty nature to a certain extent, seems to carry more permanent pay chutes than the slate lying east of it near the contact of the two bodies. East of the contact in the slate there are some large veins that at no distant day will be worked to a profit. Unlike most of the ledges here, they are not of a pocketty nature, but what are termed low-grade milling propositions. In most of them the ore is of the refractory class, but in this age of progress, when science is advancing with such rapid strides, the difficulty and great expense of reducing this class of ore will soon be overcome, so that the valuable minerals contained in those large bodies will be extracted at a profit. The crippled condition of the mining industry in this county, like many more, caused from the lack of capital and enterprising men with means to develop the mines, has caused a stagnation in all branches of business that the revival of the mining industry alone can remove. The agricultural production of Placer

county can never produce the prosperity for its people that the mining industry has in the past and will in the future when it is pursued to the extent it is in some other places. This it takes no philosopher to foresee. The gold is in the ground in almost inexhaustible quantity, and what it requires is perseveriog and enterprising men backed by capital to take it out at a profit and bring about this era of prosperity that will benefit one and all alike.

Placer county, Nov. 3, 1893. "ALEX QUARTZ."

The Repeal—What Next?

TO THE EDITOR:—It is now settled; the Government purchases no more silver. The effect on the market is a problem. It is predicted by some that silver will gradually settle down to a nominal price, yet with repeal now certain there has been no slump, as when India stopped free coinage. Others believe silver has touched bottom. It is evident that the production will fall off largely, and this may arrest further material decline. Should there be a serious decline, repeal will prove a boomerang to the Government. It will demonstrate that the Government was in the position of the man who had the bull by the horns.

The gold advocates in all the discussion have acted on a theory, without considering the ways and means of carrying it out. They are not miners, and do not know the mining situation. Our production is only $33,000,000 gold, including the gold by-product of silver mines, some $12,000,000, which will be mostly lost, and cannot be made up speedily by stimulated gold mining. No boom is yet apparent. These very gold advocates would not risk a dollar in the production of gold. They expect the venturesome prospector, without even grub money, to discover sources. The financial stringency, also, forbids any wild, or even conservative, investment in gold mining. New Yorkers look askance at a gold mining proposition. Of the production some $20,000,000 is absorbed in the arts. Hence any increase in the coinage will come from bond sales, or sharp trading with foreign countries. Balances of trade must be turned in our favor. The fear is that the reverse will happen, as is too likely.

The redemption fund is down to $80,000,000, and declining. The banks are drawing it down to strengthen their position, though it weakens the Government, which must stand behind them.

The gold advocates and the Government have trampled on silver, and, with each decline, blazoned its depreciation on the bulletin board, chaffered with the bullion-sellers, and helped on the disaster, nathless the fact that we have over $500,000,000 of silver coinage to take care of, and that every kick would prove a boomerang. The Government has "gone long," as the brokers say, on this vast sum—the whole world $3,500,000,000—and now bears the market and breaks it down by its suicidal policy. It is pledged to redeem the silver paper, and silver in gold when called upon. Its course naturally scares people to convert their silver, and it should not surprise anybody to see a steady drain of the treasury of its gold. It is not impossible that specie payments may have to be suspended, and gold sent to a premium equal to the difference in silver. It would be the logical consequence of the war on one-half our metallic money. The people may take the gold-bugs at their word, and the Government may find that to let go the hold it had on the bull is to get gored. *Nous verrons!*

When the Governments of the world—our own the first—made war upon silver, the effect on the existing coinage was forgotten. They seemingly overlooked the fact also that the value of both silver and gold was made by its demand as a money metal, and that only by maintaining this use as money could the value of the stock on hand be sustained. The commercial use was, and is, too small to absorb half the production of either metal. Safety could be found only in continuing a time-honored treatment of the metal. The increased commerce of the world would, and does, require all that can be produced of either metal, and no redundancy need be feared if paper issues were made, dollar against dollar.

We have about $700,000,000 of "uncovered paper" that could gradually be retired to make room for silver as well as gold. The prejudice of the East can be accommodated by representative paper, as well as uncovered paper. But the Government is not bound to heed this miserable prejudice in favor of "rag money." It is high time that the Eastern people were told that they must use what the treasury has to give, and partial payments in silver should be made by the Government, and paper issues be limited to $10. In England no paper is issued under $25. This would force a demand for silver, and the people would soon like it. The Californian has little respect for this Eastern prejudice, which is just as great against gold.

The effect of the warfare against silver on a great industry with all its invested capital in cities, railroads, mines, farms, etc., has been ignored as if of no concern to the Government or to the Eastern people. The East thought they could strike the Rocky mountains and not get themselves hurt. The Republican party, whose stock in trade is Protection to all industries, have belied their profession and made war upon an industry fraught with more consequences for weal or woe than any other single industry. Scarcely does any other industry so ramify every other. It calls for iron mines, lime, coal, charcoal, farms, railroads, machinery, and for laborers, without number, at high wages. It produces all the base metals as well as silver and gold, yet the Republican press of the East has done its best to down the industry, the New York *Tribune* being the most beastly of all in its warfare.

We now demand a financial system that shall *utilize* this grand industry—not only save it from ruin, but foster and encourage it. It was built up on the practice of ages and the implied faith of the Government.

The printing of unsound paper by the cord, which helps no industry, must stop. We must have a metallic currency—this will solve the problem. Away with all paper under $10, and let that be our $10 of gold and silver back of it. It would take many years to supplant the present volume of "unsound paper," which Stuart Mill calls "a form of robbery." Stop making merchandise of money metals! Let American silver go direct to the mints and be made sound by free coinage at 16 to 1, the time-honored ratio that miners know still exists as to risk and cost, and thus abolish quotations of bullion. Let the Government take the odd 29 grains, if need be, for seigniorage, giving the miner $1 arbitrary per ounce in bright dollars and half dollars, and they will be accepted by every miner and merchant in the Pacific States and kept in circulation.

The fight is still on. Let the battle cry be, No making merchandise of silver! American silver must go direct to the mint, no matter what the rest of the world does. This country is big enough to take care of its own productions and to maintain arbitrary coinage. Silver is a domestic money, always was and always will be. Gold always settled balances of trade with the gold countries and always will. GEO. PARTRIDGE.

San Francisco, November 5, 1893.

A Big River Mining Scheme.

Brief reference was recently made in the MINING AND SCIENTIFIC PRESS to a project of capitalists at Redding, Shasta county, to divert the Sacramento river at Turtle bay, and mine in the river bed for the distance of about one and a half miles. More complete particulars develop the fact that the enterprise is to be one of the largest ever undertaken in the State, and that the plans are now nearly perfected for the commencement of operations in the early spring on an extensive scale. The backers of the project are the Redding Electric Light and Power Company and the Redding Water Works Company, of which Francis Smith, the well-known pipe manufacturer of this city, is principal owner, and Fred H. Deakin and Walter Deakin, local capitalists. The enterprise is to be carried out through a combination of their various interests, including an irrigation project and the transfer of 500 acres of land now included in Fred H. Deakin's Riverside addition, within the corporate limits of Redding. No difficult engineering problem is to be solved, and advantage is to be taken of natural formation and certain works now already constructed for the diversion of the stream.

The general course of the Sacramento river is southerly, but at Redding it makes a broad sweep to the southeast and thence by an acute bend returns to the west, enclosing a peninsula made up of a great mass of auriferous gravel. In past times the river course was directly across the base of the peninsula, but it has for some time been gradually swinging to the east, leaving indelible proofs of its slow eastern progress in the great beds of gravel. The old course is clearly marked by a slough, which makes a direct cut across the peninsula from what is known as Turtle bay, on the south bank of the main river, to the point at which it swings from its westerly direction to the south. The direction of the slough is almost north and south and it forms the base of a rude right angle, whose legs are made by the river in its detour and whose apex is at the river's sharp turn from nearly southeast to west, making thereat an angle of about 60 deg. The base of the triangle is one-half mile long and the two legs nearly one and a half miles. With this explanation the nature of the proposition can be understood.

It is proposed to make an artificial channel north across the peninsula from its outlet to its inlet at Turtle bay. The gravel will be mined by sluices as work proceeds, and the excavation will be as near bedrock as possible. It is expected that the gold will pay enough to offset the cost of excavation, and that nominally, therefore, the expense will be little or nothing. The water will be turned into the artificial channel and the bed of the main river then mined.

In the river at Turtle bay the electric light company and the water company have already erected a shear-dam for the purpose of supplying a two-mile ditch, 30 feet wide at the top. This ditch is already built, and in an 18-foot fall gives 600-horse power to four water-wheels at the free bridge. Its location is west of the proposed cut. The shear-dam was built to turn a uniform volume of water into Turtle bay at all seasons of the year, whence it flows into the ditch without the means of headgates or other mechanical aids. The presence of Turtle bay makes the outlet of water from the river a comparatively simple proposition. It is an essential part of the scheme to extend the water company's ditch down the Sacramento valley, where it will be used for irrigating purposes. As outlined now, it is proposed to furnish about 32,000 acres of land with water. The course will be from Redding to Cottonwood, via Anderson, a distance of over 20 miles.

At the location of the shear-dam the Sacramento is about 300 feet wide, and is on an average about six feet deep at low water. The current is moderate. No exact calculation of the volume of water to be diverted has yet been made, but it will be seen that it is immense. The shear-dam is built about half way across the river, at an easy angle with the current. For the remaining distance, four stone piers are to be erected, and the dam will be made complete by heavy drop-timbers connecting the piers. With the approach of high water in the fall these timbers will be removed, and the water allowed to continue during the winter in its natural channel. The shear-dam and the piers are, of course, permanent. It is thought that at least four months each year can be devoted to uninterrupted mining.

The slough channel and the irrigation and water-works channel (the latter already partly built, as stated) are expected to be quite sufficient to dispose of the volume of water at ordinary stages. It will be possible to make the slough channel as large as desired. It is intended finally to work all the gravel between it and the natural river bed, on the east. Construction will be begun at the outlet. It can be carried on without the aid of a dam protecting against back-water at ordinary stages of water.

The value of the gravel in the river bed is not definitely known, but it is without doubt great. Mr. Fred H. Deakin recently caused a shaft to be sunk fourteen feet at the river's edge with the aid of powerful pumps. The gold became heavier at every foot. A nugget worth $30 was obtained near the bottom. At the surface the gravel will unquestionably pay well. It is stated that a scow on the river above Redding, with dredge, water-wheel and sluice boxes, is making from $25 to $50 per day. It is a common thing at Redding for miners to take a pan, wade out waist deep into the stream, scoop up sand and gravel, return to the shore, and work it in a rocker. In this rude and laborious way, $2.50 and $3 per day are realized regularly per man. The exact distance to bedrock is not known.

The originator and chief promoter of the enterprise is Mr. Fred H. Deakin, who has business interests in San Francisco and in Redding, besides being the owner of about 43,000 acres of timber land in California. As long ago as 1886 he acquired land adjoining the river and has been at work ever since to consolidate the various interests and bring into working shape the project then contemplated. Mining claims have been located along the river in due form, and the land on the east as well as the west banks acquired, to prevent any possible complication with riparian owners. The Sacramento is unnavigable at Redding and no objection on the part of the Government is to be feared. It is expected the corporation will be completed within 30 days, under the name of the Northern California Development Company, with the following officers: President, Francis Smith; vice-president and general manager, Fred H. Deakin; superintendent, S. P. Fillman; secretary, L. Fillman; treasurer, R. M. Saeltzer. The Redding water works and electric-light plant will be a part of the assets of the new organization. Mr. Deakin is somewhat proud of the fact that the company will be controlled and operated wholly by Americans and American capital. Financial aid for such enterprises, as is well known, is frequently sought in England.

Mine Surveying—The Mine Corps.

The method of dividing the work in an underground survey depends on the size of the corps, writes Prof. Edward H. Williams Jr., in the *Colliery Engineer*. We will, therefore, consider the work of each man in order to get the right number for the corps. The chief of the party should be where he can do the most good, and where he can plan the work for his subordinates. The principal point of the survey is the setting of the stations so as to do the work thoroughly with the fewest set-ups, so as to diminish the chances of error in instrumental work. The chief should locate the stations and add all the necessary signs to show how the work is to be done. The transitman should not have his attention distracted from his par-

ticnlar work by questlons as to procedure. He should work nntrameled. The chief, therefore, shonld not rnn transit. Upon thls basls the ideal mine corps works, and such a corps consists of at least four, and better five, men from the office, and three from the mine. It is divided into two sections. The chief takes the men supplied by the mlne—one or more of whom are acqualnted with the work done since the last survey—and locates the stations; the transitman follows with the second sectlon to measure angles and dlstances. By this time the stations are set and the chlef takes his men after the transit party and gets the side notes wlth a check measurement of the distances between stations.

Such a corps goes to the end of the former survey and ldentlfies the two last stations. The transitman prepares to set up at the last, whlle the chief and party go as far as they can see the llght from the last station, or to some lntermediate point from which one or more slghts are to be taken. He then stops and sends a man along each place where a sight must be taken, as long as thelr lights are plainly seen from top to bottom where he ls standing, and over this place he marks a point for a station to be lnserted, and generally lnserts it himself unless he be pushed for work, and must leave lt for another to do, when he places a circle about the dot, places the nnmber at the side and as many arrows as there are new statlons, the longer polnting to the sight to be last taken and where the transit is to be set up next. Leavlng a back slght at the point just set, he sets successlvely stations at the points where the foresight men have stood ln the manner just described till he has covered the new work, the mine boss or some intelllgent miner going with hlm to give hlm an ldea of the "lay of the ground," so that the work can be covered with the fewest number of stations. Sometlmes the chief takes the sldenotes and measures the distances between stations as fast as they are set. If on a pitch, a clrcnlar brass protractor with small plummet is hung at the center of the stretched tape to give the angle at which lt is held to serve as a check to the measurements of the translt party, which are taken as the basls of the work, and the other measurements are solely as checks. In flat work both measurements should colncide.

In a small corps, and where time ls of little lmportance, the foresight man puts in the stations ahead of the transit, and, while he ls so doing, the transltman takes the side notes. Sometimes the side notes are taken by the same man while one of the party is taking the transit to the next station and settlng it up for the next sight. There are about as many variatlons from these two methods as there are corps.

The foreslghtman should be intelligent and active, as the amount of work done in a day depends npon his ability to keep ahead of the transltman. Some of the latter are fast enough to keep two forsightmen on the jump. His duty is to set the center of the next set-up under the station, and also place the tripod if three are used in the work, to give the slght, and, ln some corps, to carry the front end of the tape and assist in taking the distance. In some corps he also carries the bag with tools for setting stations, so that he generally has a load that makes rapidity of movement difficnlt, and anything that will dimlnish the weight carried will tend to quicken the work.

The rapidlty wlth which good work is done varies conslderably, but it depends upon the activity of transit and forsightman, and a good corps, should have no trouble in making 12 set-ups an hour, and taking two or three sights from each set-up. It varies also with the distances between stations. The saving of time should never be sought at the expense of accuracy ln the work; it is to be gained by rapldity of moving about; in setting transit, center, etc., and ln hanging plummets to give sight. The fore and back sightmen should be in position to give slght before the transitman is ready, so that he can turn hls instrument on one and the other and find them in posltion. The slowest parties were those that carried empty powder kegs (in the days when loose powder was allowed lnside) for seats and spent the greater part of the time sitting on them.

The backsight has little to do inside, and to compensate for this, he is the one who cleans and oils the tape, gets out new plnmmet strings and sees that the tools are ready for the next work, as soon as the corps get to the office.

The transitman cleans the transit, unless the corps has subordinates who can be trusted with so delicate an instrument. The blackening from sulphuretted hydrogen is rubbed from the slivered surfaces with whiting, and the oil or palnt smears are removed wlth alcohol. Alcohol should be used instead of water for cleaning the instruments, and especially the lenses, which are wiped with jeweler's cotton or soft chamois skin.

THE famous Utica quartz mine at Angels broke the record of its monthly yields in October, the clean-up amonnting to $182,000: $111,000 of the treasure was in 100-pound bars.

The Story of Marshall's Find.

A correspondent (E. R. C.), writing to the *Bulletin*, gives an account of the discovery of gold in the tail-race at Sutter's Sawmill, as told to him by John A. Sutter and Mrs. Weimar, the parties after Marshall most directly concerned and cognizant of all the surrounding circumstances.

The writer first became acqnainted with Captain Sutter at the Niantic Hotel in San Francisco early in 1852, aod from hlm had a very full and graphic account of the gold discovery at Coloma, going into all the details connected with this event.

Without repeating what ls famlliar to most readers regarding this discovery, about which so much has been written and published, the writer will confine himself to the old pioneer's account of Marshall's visit with the gold specimens picked up at the mill, and the tests applied to determine their genuine character. Marshall came to the fort at Sacramento early one morning in the latter part of January, 1848, having ridden the greater part of the night before from Coloma, and with an air of mystery requested a conference in Sutter's private office. Upon entering he locked the door, to exclude outsiders, of whom there was at that time a large number. Taking from his pocket a pouch which he opened, displaying quite a number of shining particles of yellow metal, to quote Sutter's exact language, he asked in an excited manner: "Ish not tish gold?" The narrator added that the only test available was nitric acid and all the authority at hand bearing upon the matter was a copy of the "Encyclopedia Brittanica."

Upon applying the acid the true character of the metal was established beyond a doubt. Sutter then requested Marshall to keep the matter secret until the mill was completed. As there were eavesdroppers, attracted by Marshall's mysterious manner, who had heard the conversation, this was an utter lmpossibllity. The news spread like wildfire, and the frame of the old mill stood for years a monument of this startling event. The ground once occupied by this relic, with the twin pine trees standing near by, has long since been moved over and over again, and not a vestige of the orlginal structure remains.

The next party from whom the wrlter had an account of this discovery, detailed a few months later, was the wife of Peter Weimar, who was employed in building the mill, and with whom Marshall and others engaged ln the work boarded at the time. Welmar died aged 82 years, at the residence of a brother-in-law in San Luis Obispo county, on the 16th day of August, 1892, the death of his wife occurring a few years previously.

According to her account Marshall, having gone to the mill early in the morning to shut off the water left running through the tail-race the night previous, in order to wash out the sand and save excavation, discovered the nugget in question shining through the water in the crevice of a rock, and, exhibiting it, expressed the opinion that lt was the precious metal. The Weimars, who were from the gold region in Georgia, concurred ln this opinion, but in order to test the matter more fully Mrs. Weimar stated that as she was making soap at the time she threw the nugget into the boiling alkali and with lt a ring she had purchased for gold some years previous.

The soap being sufficiently "cooked," the lady having had the proverbial "luck" which attaches to this important chemical compound, the kettle was set aside for the article to harden. A short time after Marshall according to the lady's account, made the lnquiry: "Jenny, what's become of our gold?" Thereupon she proceeded to cut out the customary squares, and then with bared arm picked out from the caustic alkali sediment the nugget and the ring. While the former was brightened by the process, the latter was corroded and almost eaten np by the caustic llquid. Then lt was that Marshall, gathering up a number of particles of the metal, set out post-haste for Sutter's Fort.

Some accounts have stated that Mrs. Wlemar claimed that her husband first made the discovery, but she did not assert such claim at the time she gave this account to the wrlter. This lady stated ln this connection that Barnum had offered $500 for this specimen, which weighed a fraction less than $5. Both the writer of this and the party by whom he was introduced advised the acceptance of this offer of the world-renowned showman. The lady on this occasion mentioned that she had often bartered with the Indians, who were numerous at that time, a handful of hard bread for a handful of gold, and the same rates were willingly paid for a yard of calico.

The account given the writer a few years later of his discovery, by Marshall, did not differ materially from that of Sutter and Mrs. Wlemar. There seems to be a doubt as to the exact date of the finding of this nugget. Members of the Society of California Pioneers of this city have been ln correpondence with their Sacramento brethren in relation to this matter, in order that some definite day may be fixed npon to celebrate the event. The writer's lmpression is that Marshall stated that the find occurred on the 19th of January, 1848. Dr. W. W. Light, a member of the Sacramento Pioneers' Association, who was intimate with Marshall, corresponding with him up to the time of his death, and who was shown by him the precise spot from which the nugget was taken, entertains the same opinion.

The writer of this, a few weeks ago, in company with the gentleman named, visited Sutter's Fort, which has, with the surrounding walls, been rebuilt, constructed of adobes manufactured on the ground, and surmounted with tiles from an adjacent pottery. Many relics of the gold-finder and the old commandant are displayed in the main building, but it is extremely doubtful whether, if either were permitted to "revisit the glimpses of the moon," they would recognize the old fort in its new dress. E. R. C.

Hirsh's Aluminum Process Again.

J. M. Hirsh, who has had a more or less pyrotechnic career in promotion of a certain mysterious aluminum process in Chicago aod New York, has turned up at Ellensburg, Wash., where he has organized the Washington Aluminum Manufacturing Company, the incorporators of whom are J. M. Hirsh, of Chicago, and W. H. F. Briggs, A. H. Stulfauth, T. T. Wilson and W. A. Bull, of Ellensburg. The principal place of business will be at or near Ellensburg, and the works will be located at or near Thrall, in Kittitas county. Speaking of the organization and the principal promotor, the Ellensburg *Capital* says:

"Material carrying a high percentage of aluminum has been definitely located near Ellensburg in large quantities, and this company is the outcome of the discovery. J. M. Hirsh, one of the incorporators, is the well-known manufacturer of aluminum in Chicago, and he is equipped for the enterprise with plenty of experience and a financial reputation that is bound to add strength to any enterprise he may connect himself with."

J. M. Hirsh occupied quite a large share of public attention in metallurgical circles about two years ago. He claimed to have discovered an electrical process by which aluminum was deposited from an aqueous solution, and that the value of the practically exclusive method owned by the Pittsburg Reduction Company would thereby be greatly reduced, if not destroyed. The Chicago Aluminum Manufacturing Company was organized, and the capital and interest of several persons were enlisted. Five thousand dollars were advanced to Hirsh. He rented a five-story building on West Twelfth and Rockwell streets, Chicago. But little work in actually producing aluminum appears to have been done, and little or no use was made of the five-story building. Hirsh's backers became impatient. They waoted him to go to Washington and take ont a patent on his process. He refused. But he went to New York, where his movements aroused the suspicion of those interested with him. He called upon a well-known chemical expert and showed him an ordinary faucet, said to be plated with aluminum, and asked to have the plating tested. The test proved that the plating was aluminum. Hirsh then represented that the chemist (Francis Wyatt, Ph. D.) had endorsed his process. He subsequently caused a letter to be printed in the Chicago *Herald*, signed by Wyatt and addressed to Hirsh, unqualifiedly commending the process. Mr. Wyatt had indeed written a letter to Hirsh's brother, a close friend of Wyatt, giving the result of the analysis and including these words:

"I am entirely at your brother's (J. M. Hirsh) disposal to witness and report upon any experiments he may desire to make in my presence, but, as I told him in the plainest possible language, I will not put myself on record until I know exactly what I am talking about, and exactly how I am to fight the battles that I know must follow my publication."

These expressions Hirsh deliberately expunged from the letter he professed to have received from Wyatt. His action was denounced by Wyatt, who declared his lack of confidence in Hirsh and his process.

There were many other features of Hirsh's record that might prove interesting to the public and to his new associates at Ellensburg, but they would take up too much space. Hirsh always refused to disclose the nature of his process to aoy one or to perform any experiments in the presence of competent chemists. In New York he made frequeot calls at the International Aluminum Works, they state with the apparent object of getting information about their methods. Hirsh got into trouble with his associates by starting a new company with $2,000,000 capital and giving it the right to plate with aluminum, claiming that the original organization was only to maoufacture the metal in bulk. The Chicago *Daily News* exposed Hirsh Jan. 14, 1891. Hirsh's backers claimed to have given him $15,000, but he wanted $100,000. They believed in Hirsh because he showed them the aluminum he claimed to have manufactured. It would be well for the Ellensburg people to know exactly what Hirsh's method is, and who Hirsh is, before they indorse him and his process.

Mechanical Progress.

Jet Boat-Propulsion.

A London weekly recently pointed out why jet propulsion of boats, which has recently attracted some attention, will never equal the screw or paddle-wheels for efficiency.

The chief reason is this: The power in a boat or self-navigating ship is not applied quite as on the locomotive. The driving-wheels of an engine take hold of a fixed base, and thrust against it, or a series of such bases, all the while. But the mechanical appliances used in propelling a vessel at sea act upon an extremely mobile mass; something that tends to slip, and does to some extent slip away from them. It is only because the weight or inertia of the portion immediately in contact with the oar, paddle-wheel or screw offers some resistance that any headway is secured; and the larger the watery bulk acted upon the more stable it will be, and hence the more progress will be secured. Now an equal amount of power may be consumed in moving a little water a great distance astern and a large amount a small distance. In the former case, however, the leverage is almost lost; and in the latter it is largely retained. Consequently it is desirable to apply the power so as to strike broad surfaces rather slowly, instead of small ones with great velocity.

Another minor consideration is worth mentioning. In the jet system water has to be pumped into the moving vessel before it is ejected; and a certain amount of force must be consumed in giving to it, in the interval, the forward motion which every other object inside of the craft has. This subtracts from the amount of power available for propulsion.

To Improve Lard Oil.

A few years ago, having to use lard oil for lubricating purposes, and finding it to gum on cast-iron surfaces so much as to be detrimental, and imagining that the gumming quality in the oil was gelatine, I filtered a quantity of it through tannic acid, says a writer in the *Engineering Magazine*. This certainly improved it, but was expensive. Now, lard oil is without doubt one of the best lubricating oils known, but it will get gummy with the conditions above named, and I have looked for many years for a means to rid it of its sole evil element. Recently, having occasion to experiment with an oil filter, I noticed that one of the printed directions is aimed toward the fact that too much heat in the water with which this filter is charged will coagulate lard oils. I find this to be a fact, and, further, that the coagulated particles will precipitate, and after a few days be found at the bottom of the oil. The oil then can be poured off, and it seems to have parted with its gummy quality. If others will try this, and if they find the same result, an improved lard oil is possible, and the improvement will be a cheap one in respect to its first cost.

The New Navy Rifle.

The new rifle for the navy is 0.234 of an inch caliber, the smallest regularly adopted by any government. The caliber of the French Lebel rifle is 0.315; the German Mannlicher is 0.311; the Danish Krag-Jorgensen is 0.315; the English Lee-Speed, 0.303; the Swiss Schmidt, 0.295; and our new army model, 0.30. The small caliber is recommended by the ordnance authorities on the ground that it will give higher velocity, greater range, greater penetration and greater accuracy than the 0.30, with the added advantage of allowing the men to carry a greater supply of ammunition. The disadvantage is the lack of interchangeability of ammunition between the two services. In the last few years the reduction in caliber has been phenomenal. The English Martini and the old Springfield rifles were 0.45, the famous Chassepot of France 0.433, the Russian Berdan 0.42. The department will, if necessary, furnish the barrels for the manufacturers to apply the breech mechanism. The barrels will be made of nickel-steel alloy.

Cutting-Tool Wear.

Cutting tools on metals do not always wear to the extent they are supposed to wear, says the *Engineering Magazine*. Ordinarily they are burned by too great a speed. It may not be amiss here to explain what this burn is. When two pieces of similar metal are moved, the one upon the other, while held together with considerable pressure and without a lubricant, they soon will weld together at the point undergoing the greatest strain and friction. Thus, an iron shaft in an iron box becomes cut or galled, and thus the point of a steel tool when cutting iron is often taken away after doing but little work. Dissimilar metals do not burn each other to so great an extent. When an iron shaft is contained in a box of bronze, one metal being no harder than the other, they seldom or never unite; therefore a steel tool can cut brass or hard bronze at very high speeds. In planing cast steel it is questionable whether a speed above 12 feet per minute is safe, but in cast iron, where graphite is present in the iron, it lubricates the tool, and sometimes it is safe to cut 20 feet each minute through the material.

To Renew Old Belting.

A machine has been invented which is expected to strengthen old belting. As described in the *Journal of Commerce* the machine consists of two large, hollow copper cylinders. Steam is admitted into these cylinders and so they are always heated. In a tank there is a solution made of beeswax, borax, glue, starch and molasses, prepared in equal quantities. The solution is in liquid form. There are guide rollers, and the leather belting which is in process of treatment runs through them. The belt to be operated upon is started into the machine at a point where it can enter the tank, and while passing through this tank the leather receives an application of the solution. The press rollers immediately squeeze the compound into the fiber of the leather and then the heat from the cylinders, over which the belting is being drawn, dries the compound. All the rollers and cylinders rest in the bearings. The result of applying this compound to the belt and immediately drying it is said to add strength to the fiber of the leather to a remarkable degree.

Austrian Concrete Tests.

The Austrian Society of Engineers and Architects has recently been making tests of concrete for arches. In every case the span was 13.3 feet, and the rise (with one exception) 15¾ inches. It was found that the breaking load for a brick arch six inches thick was equal to 321½ pounds per square inch. A concrete arch four inches thick was ascertained to be of more than double that strength, as the load was 737⅓ pounds per square inch. A concrete arch only 2⅜ inches thick, with iron rods along the intrados, was equal to 839 pounds to the inch. When steel joists 3⅛ inches deep, bent to the curve, were imbedded in a concrete arch of the same depth, and with a rise of 11 inches, a breaking weight of 3360 pounds per square inch was required.

A Novel Gun.

The recent successful test, as announced, of a small copper model gun, tempered by the process invented by Allard of Quebec, has attracted considerable attention, says the New York *Sun*. Before firing the gun was carefully gauged at two different points, one and two inches from the breech end of the powder chamber. In the first experiment the gun was charged with three-fourths of an ounce of sporting powder, and wadded with a plug of paper driven well home with a mallet. After firing the charge the gun was examined and gauged at the above-mentioned points, and the diameters were unchanged. The next test was a very severe one, one and three-fourths ounces of sporting powder being used, leaving only sufficient room for a plug of paper, which, as before, was driven hard home, filling the piece to the muzzle. This charge was fired with Bickford fuse, and subsequent examination of the gun showed no flaw or perceptible expansion.

Scientific Progress.

Is It a Fault of the All-Wise?

Sir Isaac Newton, who preceded Laplace by about a century, had found evidence, as he claimed, that the material universe is the work of an all-wise designer, says Daniel Kirkwood in *Popular Science Monthly*. The author of the Mecanique Celeste, the greatest mathematical astronomer of his age, seldom discussed questions of a moral nature; but, not accepting Newton's views, on the doctrine of final causes, or the doctrine of design in the material world, he took occasion to point out a so-called failure of nature in adapting means to ends. If the moon was designed to give light by night, the purpose, he said, had largely failed, and he (Laplace) could suggest a better plan. But the entire passage is quoted as follows: "Some partisans of final causes have imagined that the moon was given to the earth to afford it light during the night. But in this case nature would not have attained the end proposed, since we are often deprived at the same time of the light of both sun and moon. To have accomplished this end, it would have been sufficient to have placed the moon at first in opposition to the sun, and in the plane of the ecliptic, at a distance from the earth equal to the one-hundredth part of the distance of the earth from the sun, and to have impressed on the earth and moon parallel velocities proportional to their distances from the sun. In this case, the moon, being constantly in position to the sun, would have described round it an ellipse similar to that of the earth. These two bodies would then constantly succeed each other, and as at this distance the moon could not be eclipsed, its light would always replace that of the sun."

Features of the Moon's Face.

Mr. Gilbert's address as retiring president of the Washington Philosophical Society is an array of arguments in favor of the impact theory to account for the origin of the features of the moon's face. His hypothesis is that material constituting the moon once surrounded the earth in the form of a Saturnian ring; that the small bodies of this ring coalesced, first gathering around a large number of the nuclei, and finally all uniting in a single sphere, the moon; that the lunar craters are the scars resulting from the collision of the moonlets.

This hypothesis reconciles the impact theory with the circular outline of the lunar craters, and explains the abundance of colliding bodies of large magnitude, says the *American Naturalist*. The author discusses the probabilities of the formation, according to his theory, of lunar wreathes, central hills, arched inner plains, level inner plains, and the association of inner plains with central hills. He finds his theory adequate to explain all these phenomena, as well as the peculiarities known as furrows, sculpture, rills and rill pits. In regard to the "white streaks," Mr. Gilbert quotes, as in accordance with his own idea, an unpublished suggestion made by Mr. William Wurdeman, that "a meteorite (moonlet) striking the moon with great force spattered whitish matter in various directions."

During the growth of the moon, many moonlets must have collided with the earth and formed impact craters which have been obliterated by erosion and sedimentation. It is possible, the writer suggests, that these collisions imitated not only the differentiation of continental and ocean plateaus, but the series of geographic transformations of which geologic structure is the record.

Chemical History of the Atmosphere.

Dr. Phipson gives in *Chemical News* the chemical history of the atmosphere from its origin to the present day, in accordance with the results of his observations and experiments. Premising that the matter composing the earth was originally in a gaseous condition at such temperature that no compounds could exist, he assumes that, when a solid crust later covered an internal molten mass, water was condensed upon the surface and a primitive atmosphere of nitrogen surrounded the globe. Into this atmosphere large quantities of carbonic acid and water were evolved by volcanic action, but there was no free oxygen. Plants then made their appearance, and, in vegetating, evolved oxygen copiously, deriving this element from the carbonic acid supplied by volcanic action. When a certain proportion of oxygen was attained, animal life became possible and duly appeared. At the same time the proportion of carbonic acid became less, the carbon being stored up as coal, peat, lignite, etc. As these processes proceeded animal life of higher order appeared, the development of the nervous system coinciding with the increase of oxygen in the air. As evidence that the composition of the atmosphere is still slowly changing, it is stated that the latest and most careful determinations of carbonic acid in the air have shown a decided decrease (0·05 to 0·03) in the last 50 years.

Isolation of Fluorine.

The complete isolation of fluorine by a French scientist is a recent chemical triumph which has excited much interest. Fluorine, as described for the popular understanding, has a smell resembling that of hypochlorous acid, which is somewhat masked by the odor of ozone, from its action on water vapor, says the New York *Sun*. It, of course, acts powerfully on the respiratory organs, even when greatly diluted, and it causes insensibility, lasting as long as a week or more, of the mucous membrane of the nose.

It is of a yellowish green color, somewhat lighter and yellower than chlorine. It combines explosively with hydrogen, even at a great cold and in the dark, and sulphur, selenium and tellurium take fire in it at ordinary temperatures. Bromine and iodine burn in it with a flame at low temperature, and amorphous carbon, amorphous boron, and especially crystalline silicon, with the evolution of great heat. Many other substances burn in it, oxygen and nitrogen appearing to be the only elements with which it does not unite.

Chemicals in Extreme Cold.

That extreme cold paralyzes every vital function is, of course, a piece of every-day knowledge, says the *Journal of Commerce*. But it has been left to Prof. Pictet, who has been conducting some experiments on this subject, to discover that at a temperature of 150 degrees below the centigrade zero there is no chemical action between nitric or sulphuric acid and potash, between oxygen and potassium, though under ordinary circumstances the affinity of the latter metal for oxygen is so great that it will burn if thrown into water, owing to its combination with the oxygen in the fluid. But if the electric spark is played on bodies which have thus lost the power of chemical affinity, some new and curious combinations result.

The latest investigations, the conclusions of which, however, have been theoretically presaged for some years past, may require us to consider the question of the temperature of outer space and the possihility of an atmosphere composed of gases in combination existing there.

Scientifio Notes.

Upward of 60 per cent of the earthquakes that have heen recorded have occnrred during the six coldest months of the year, the maximum number in January and the minimum in July.

Mr. Morris Gibhs has shown that the songs of birds remain the same, regardless of the psychological state of the singer. This conclusion is based on observations made on 50 species of song birds.

Mr. Clarence King, the well-known geologist, has computed the earth's age on the hasis of experiments made, on the effect of heat and pressure on certain rocks. Mr. King concludes that the earth's age as a planet ls 24,000,000 years.

A member of the Royal Meteorological Society has experimented on the size of raindrops, which vary from a speck so small as to he almost invisihle up to a diameter of two inches. Drops of the same size do not always contain the same amount of water. Some of the largest drops are hollow.

Nature, quoting a correspondent from Lahore, India, says: "A few days ago, in a village named Daduzal (in the Pashawa district), rain fell, preceded hy a wind storm, and with the rain came a shower of hailstones, which lasted for an hour and a few minntes. The most curious part of this occurrence is that the hallstones, when touched, were not at all cold, and when put in the mouth tasted like sugar.

Another Arctic expeditlon is to start from the United States next year. It is to he under the leadership of Robert Stein of the geographical survey, and lts object is the exploration of the territory to the north of Baffin's bay and the west of Smith's sound. Eight men will form the party, and will go hy steamer to Jones' sound, where a supply station will he erected. From that point the party will explore as far as possible to the north and west.

Contrary to the opinion of eminent geologists, Prof. Bonney contends that glaciers exert no excavating action, and thls conclusion he bases on facts observed by him in the Swiss Alps. He had followed up many of the valleys in Switzerland, and the work of the glaciers in every instance should, he believes, be classed rather as abrasive than erosive. In the absence, however, of the erosive theory, it will he difficult to account for the present character of many of the lochs on the west coast and in the interior of Scotland.

In one of his remarkable lectures, Tesla states that most scientific men now look upon the varlous forms of manifestations of the same nature as those of radiant heat and light. The phenomena of light and heat, and others heside, may therefore be called electrical phenomena, and thus it is that electrical science has become the mother science of all and lts study all-important. The day when we shall know exactly what electricity is will chronicle an event probably greater and of more moment than any other recorded in the history of the human race.

Wing Area of Flying Animals.

M. de Lncy, a French naturalist, has shown that the wing area of flying animals varies from about 49 sqnare feet per pound of weight in the gnat and 5 square feet in the swallow to half a square foot per pound of weight in the Australian crane, which welghs 21 pounds and yet flies well. If we were to adopt the last or smallest proportion, a man weighing 12 stone would require a palr of wings each of them 14 feet long hy 3 feet broad.

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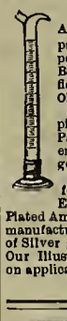

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Electricity.

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No invention of modern times, unless it was the steam engine, has exerted such a far-reaching influence over the distribution of population as that of Sir Henry Bessemer in his process of making cheap steel, says Oscar Bradford in the *Economist*. The steel rail has enabled railroad companies to increase the weight and carrying capacity of their rolling sock and thereby so reduce the cost of freight that the farmer of the Mississipi valley could lay down his products on the Liverpool market at prices lower than any competitor. This demonstration was at the bottom of an emigration that astonished the world. Under its influence population was pushed westward nearly to the base of the Rocky mountains and to the extreme limit of the rain belt. The Bessemer converter really gave to Chicago its million and a half of people and insured growth and prosperity to St. Paul and Omaha, St. Louis and Kansas City. With a fertile soil were combined the advantages of cheap coal for heat, light and power. Water and rail transportation seemed to indicate that in the Mississippi valley and on the plains of Kansas and Nebraska there existed all the elements necessary to create an empire unequaled for numbers and wealth in the history of the universe.

But shrewd observers see in the immedlate future the commencement of a movement destined to reach proportions beyond precedent. They see conditions which insure the birth of a new and greater empire as the result of another invention—the dynamo. No one need be told of the advances made by electricity as an aid to human effort in the past ten years, even under the discouragements of undeveloped appliances and expensive fuel. What will it be with perfected mechanism and no requirements for coal? What cannot be said in favor of a country where heat, light and power are practically free, where habltations are maintained at a comfortable temperature for next to nothing, where night can be turned into day by the luminous carbon, where the cooking is done by the turning of a switch, and machinery harnessed to unlimited power, all through the agency of a waterfall inexpensively trained to man's use by a turbine wheel? Add to these advantages a soil so rich that it would manure the blackest loam in Illinois, a climate so healthful that disease is almost banished and rainfall a manifestation to be controlled independently by the will of each cultivator; locate mountains of gold, silver, copper and lead ores, of coal and iron, every variety of building stone and sand and clay without limit; find thousands of square miles of valuable timber, broken and threaded by beautiful lakes and running streams, and there you have the Rocky mountain region, extending from the northern border to Arizona.

It is evident that under such conditions a comfortable existence can be maintained with the least effort, hence the certainty that with the return of financial ease a mighty movement of population will be headed toward the setting sun. That a hunger for land exists is evidenced by the contentlous strife of the lnvaders of Oklahoma and the Cherokee strip. What may be expected when the people realize that millions of acres may be had for the asking in a country which irrlgation will make as fruitful as the Nile valley and where on all sides never-failing waterfalls solicit work? What boundless opportunities will capital find for investment in the canals and electrical developments, in the railroads to be called into being by the enormous traffic and in the rapidly enhancing town and country property?

The possibilities of the subject are exhaustless, and they will soon be written in the throng of emigrants and capitalists westward on settlement and profit bent, in the swelling tide of popnlation which will enliven the mountaln valleys and make of Helena and Spokane, Salt Lake and Denver, cities in which the wealth and power of the republic will find no grander expression.

The Chloride Accumulator.

A type of storage-battery accumulator which has been tried with excellent results in France, and is about to be produced on a large scale in England, was recently described by Mr. Herbert Lloyd before the Franklin Institute in Philadelphia. It is called the "chloride" battery, not because chlorine plays any part in the actual working of the cell, but because that element is utilized in preparing the metal.

Two objects are kept in view in making the positive plates of a storage battery: (1) To present as large a surface as possible in limited space, and (2) to confine the "active material" (the peroxide of lead which is formed on that surface by chemical and electrical action) so that it will not fall off and collect in the bottom of the cell. The system just referred to consists of melting chloride of lead and chloride of zinc together, casting plates or tablets of this mixture, framing these in borders of antimonious lead, and then chemically extracting the chloride of zinc and the chlorine from the lead compound, thus leaving the lead as a very porous fabric. The extraction is performed by electrolysis, in a bath of chloride of zinc. The reason for putting the zinc into the alloy in the first place is that chloride of lead alone cannot be moulded; but with an admixture of chloride of zinc it becomes more manageable.

After the porous lead plate is thoroughly cleaned, it is converted into peroxide of lead by immersion in the usual weak acid bath and the application of electricity. The positive plate is protected by a covering of asbestos cloth; and between this and the negative plate is interposed a grooved perforated board of insulating material, which is pressed against the asbestos cloth. Thus the peroxide is held firmly in position, and free circulation of the fluid employed is permitted. One virtue of this system is that less of this latter than usual is required, and there is not much danger of spllling, with any shake or jolt, as often occurs on street-cars propelled by storage batteries.

To Indicate Underground Faults.

An ingenious instrnment for automatically indicating the place of a fault on underground conductors is being used in Berlin. An alarm is sounded at the central station the moment a fault is developed, and the location is indicated at the same moment. The usual pressure wires are used, and are so connected that a certain difference of potential exists between the copper conductor and the pressure wire. When a cable ls damaged the short circuit which then occurs between the pressure wire and the copper conductor produces a change in the voltage existing between them, which in turn actuates a relay and an alarm at the station. the relay also controls an annunciator, which denotes the position of the fault by the dropping of a square devoted to the district affected. The further efficiency of the underground electric service in Berlin is maintained by ground detectors at the station, which show the condition of the insulation, not only of the whole network, but of every single district.

Generating Heat in Water.

One of the most striking things on exhibition—remarkable on account of being so entirely out of harmony with all our ideas of the conditions under which we expect to see heat generated—is the apparatus to be seen in the exhibit, which may be appropriately termed the "water-pail forge." This consists of an ordinary wooden pail filled with water into which dips a metal plate connected with one terminal of electric circuit.

The other terminal is attached to a pair of blacksmith's tongs, with which the operator picks and holds the piece of metal to be heated. Immediately upon his plunging this into water the liquid begins to sputter and the metal to glow, until in a few seconds it is brought to a welding heat and is then speedily melted. The heatlng is so rapid that neither the water nor the metal a few inches away are more than slightly warmed. This curious phenomenon appears to be due to the localization of the resistance of the circuit at the surface of the heated metal by the lnterposition of a layer of hydrogen between the metal and the liquid. This is the explanation offered by two Belgian engineers who recently brought ont the process abroad with apparently no knowledge of its prior use in this country.

Curious Effect on Nerves.

The oscillating discharge from an electrostatic machine is said to have a peculiar physiological effect on the sensory nerves, enabling their distribution over the surface of the body to be determined by a novel and most sensitlve method. If the ball terminals of the machine are grasped in the hands nothing is felt when a series of the sparks is passing from the exciters, but if the discharge be localized on the body by means of a blunt point, whenever that point passes over a sensory nerve, the nerve is excited throughout, and a vivid sensation is experienced. The least displacement of the electrode to one side or the other causes this sensation to cease. Dr. Stephane Leduc, of the Nantes School of Medicine, claims to have made this interesting discovery.

Its Heat Not Useful.

Experiments have recently been made with a view of determining whether the qnantity of heat developed in the rheostat —which is one of the necessary evils in the operatlon of electric-railway motors—is sufficient to be of any practical assistance in warming the atmosphere of the car. The conclusion arrived at was that the amount of heat which could be thus realized is not sufficient to warrant the expense of providing special rheostats. Incidentally, however, says the *Engineering Magazine*, these resnlts go to show that the actual loss of power due to rheostatic regulation, as compared with commuted field-windings, is much smaller than has usually been assumed.

To Prevent Pipe Electrolysis.

The question of protection of underground pipes from electrolysis has recently occupied a share of attention in electrical papers. An English firm points out that by coating the pipes with two coats of anti-sulphuric enamel a complete protection is assured. This material is an elastic composition, which has been used for this purpose with the greatest success, as it is not only a perfect insulator, but, being unaffected by acids, earth salts and moisture, it is both more serviceable and effective than the tarred hemp and japan usually brought into requisition. It can be easily applied and dries rapidly.

Best for Conductors.

A prominent English engineer contends that experience has shown that silicon-bronze is the best material for electric-light and power conductors. The spans may be made 50 per cent longer than even with iron, while less costly insulators are required. This metal is already largely used abroad for telegraph and telephone lines.

Useful Information.

The Ideal Editor.

A recent address on "Journalism," by C. A. Dana, editor of the *Sun*, is full of shrewd suggestions, not only to editors, but to the large portion of the public who think that they know better how to run a newspaper than does the editor. The sum of the address is that an all-round education is essential to the highest success. What Cicero said of the orator is still more true of the editor. No kind of knowledge fails to be useful to him. Yet he must have versatility of mind to make his knowledge useful, besides a quickness of perception gained only by experience that enables him to decide promptly what will interest the part of the public that he reaches. The ability to see and report a fact exactly as it is cannot be dispensed with. In short, the editor must be one who has the widest human sympathies, and, if he would influence the world, as should be the generous ambition of every writer, he must become interested in politics, theology, and all other forces that affect human progress. A man without this ideal may be a successful writer, but he cannot be a successful editor.

Queer Rain Theory.

A most extraordinary theory has recently been propounded to show the reason why rain usually falls after a severe battle has been fought, says the Boston *Globe*.

The ancients used to attribute the phenomenon to the generosity of some deity, who was kind enough to make the attempts to wash away the traces of men's degradation as soon as possible; and later on, when cannons came to be used as a means of destroying life, the detonations of these machines were said to cause the wonderful downpour of rain.

But more prosaic, up-to-date people of today put it down to perspiration. And this is how they go to prove it:

One soldier will in the course of 12 hours' fighting give off six gallons of water. He drinks much; thirst for gore, glory and water go together on such occasions, and the total amount of moisture given off by one man is said to be sufficient to cover 12 square feet three-quarters of an inch deep.

Now, of course, all this perspiration evaporates and goes up into the atmosphere. The atmosphere, becoming unduly charged with moisture, offers itself on the slightest provocation to the formation of clouds, and in nine cases out of ten rain falls immediately condensation sets in.

Reducing Weight.

A young English girl afflicted with an undesirable amount of adipose tissue has succeeded in ridding herself of a large amount of it, without injuring her health by following the regime given below. She began by getting up at six o'clock every morning and taking a three-mile walk before breakfast, without considering the weather. At nine o'clock she had a large cup of coffee, with very little sugar and a slice of dry bread. Then she occupied herself as she liked until two o'clock, when more bread and some vegetables composed her meal. At 4:30 she was off for another long walk, followed by a cup of tea and a few dry bnscuits. Ninety days of this regime reduced her weight from 185 to 145 pounds.

A Penny.

A penny is the most ancient of English coins, says a London paper. The word was originally used for money in general. It is first mentioned in the laws of Ina, King of the West Saxons, about the close of the seventh century, and was of silver deeply indented with a cross so as to be easily broken lnto two or four parts. It is the radical denomination from which English coin is num-

bered, weighing 22½ grains troy, being the 240th part of a pound.

It is stated that Ethelbert, King of Kent, coined pennies between 500 and 616 A. D. Edward I coined pennies. In 1797 copper pennies were used, and bronze ones in 1860, valued at half the copper ones. The United States coined copper cents and half-cents in 1793, in 1857 a nickel cent, and in 1865 a bronze cent. The word penny is derived from the old German word pfant, a pledge. It was the only coin current among the Anglo-Saxons. After Edward III the coin decreased in value. To the lowest coin Robert Morris gave the name of "cent" because it was the hundredth part of a dollar. Its first coinage was in 1793.

Keeping Moths Out of Woolens.

There is one sure preventive of moths, and one which I have never seen mentioned. It is tansy, says a writer in *Good Housekeeping*. Sprinkle the leaves freely about your woolens and furs—the moths will never get into them. When I was a child my grandmother used to send me to the tansy patch on the hill, with a large basket in which to bring home plenty of tansy leaves. In the garret were five large hair-covered trunks, studded with brass nails, filled with her best blankets, coverlets, flannel sheets, etc. Some of them had never been used until my grandmother had grandchildren, notwithstanding she always had a large family to provide beds for. But the supply of her bedding, linen and other household articles were in excess of the demand. This large amount of bedding, tablecloths, towels and linen sheets were spun and woven in her father's house, and the girls were given full liberty to take all they were willing to make up for themselves. That was a part of their marriage dower. I can well remember how grandmother took the extra supply out of those trunks in the garret once a year, hung the articles on the clothesline down in the orchard, beat them, and then put them away again to lie amid the tansy leaves until another year. The fourth generation of her posterity are sleeping under those same blankets and blue and white coverlets now, which proves the efficacy of that remedy of the olden time.

Whether a water-wheel runs faster at night than in the day is a problem over which scientific readers of a German paper have been puzzling. The leading opinion is that the wheel does run faster at night, for the reason that the water is then cooler and somewhat more dense than when warmed by the sun.

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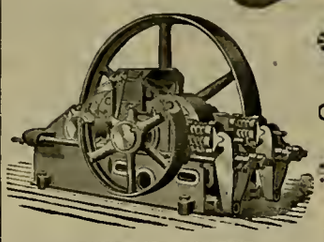

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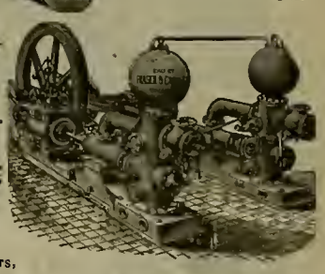

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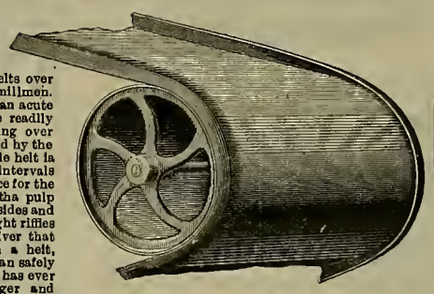

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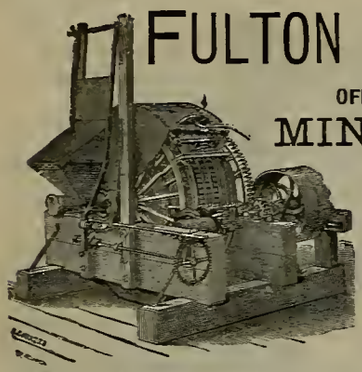

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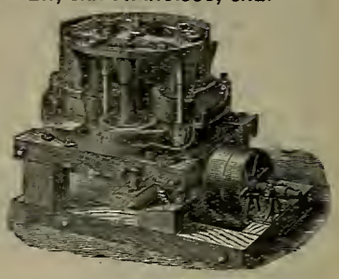

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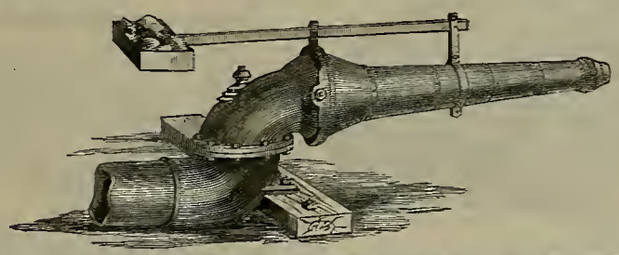

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We take pleasure in testifying to the successful operation of the Vulcan Wire Ropeway furnished us by your company. It easily transports the required quantity of ore from mine to mill and has given us no trouble whatever.

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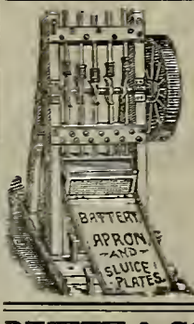

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Coast Industrial Notes.

—The electric lights of Healdsburg will shortly be in use.

—Pasadena has a hotel recently completed at a cost of $215,000.

—The streets of Santa Monica are now lighted by electric lights.

—The State capitol at Sacramento has been cleaned and repainted inside and out.

—Grape shipments from Sonoma county to the Eastern market this year netted $70 a ton.

—Spokane, Wash., has 236 electric arc lights at present, for which the city pays $8 per month each.

—Palo Alto, the university town, has filed a petition with the Santa Clara supervisors for incorporation.

—Many of the sealers at Victoria are receiving new sails, but no crews will be signed until the results of the London fur sales are known.

—An inventor of Gila county, A. T., claims to have perfected a device which will automatically elevate water from a well of any depth.

—Street car lines of Butte, Mont., will hereafter charge 10 cents for a ride to those not having tickets. The tickets are sold for five cents each.

—The Stoney creek bridge in Selkirk, B. C., the highest trestle in the world, has been replaced by a steel suspension bridge. The creek is 295 feet below the rails.

—The Cascade division of the Northern Pacific has been consolidated with the Pacific division with headquarters at Tacoma, Wash. This makes over 500 miles of road in one division.

—The execution directing the sale of the Oregon Pacific Railroad was placed in the hands of the sheriff last week. The date is fixed for Friday, December 15th. The deposit of $200,000 cash or certified checks in the required sum is to be applied on the purchase when the sale is confirmed.

—The recently consolidated street-car corporation, the Market-street Railway Co., has put into operation a system of transferring between the cable cars of the former Omnibus Co. and the cable cars on Market street. Transfers are also arranged between the Folsom-street or North Beach & Mission Railway cars and the Sixth-street or Central railway line.

—The Simpson Lumber Co. (a corporation) has caused attachments to be issued against 11 pieces of real property and the lumber yard on Fremont and Bryant streets, belonging to the Swift Lumber and Improvement Co., also a corporation. The attachments were issued in order to secure a series of claims aggregating $22,686.95, for which suit in recovery has been commenced in the Superior Court.

—The British steamer Bawnmore, Capt. Woodside, has been chartered by Grace & Co. to ply between this port and Playta, Peru, for the purpose of bringing petroleum here. Iron oil-tanks and pumps will be put in position. This is the first time that oil has been shipped here from Peru in any quantity. The Bawnmore has a carrying capacity of 3000 tons and is expected to make the round trip every two months.

—The basis of the Southern Pacific Company's new local freight tariff has been established, and the tariff, so far as completed, has been approved and accepted by the State Board of Railroad Commissioners. The new tariff will go into effect on the 1st of next January. It is estimated that it will result in a net reduction of 10.81 per cent. The new schedule will make a book of 1100 pages, about the size of Webster's dictionary.

—Work has been begun in this city on the electric street railway on lower Broadway. This line is to run from the intersection of Mason street and Broadway to the ferry. It is being constructed by the consolidated Market Street Railway Co. and will be part of what has hitherto been known as the Powell-street line. For two blocks it will use the rails of the North Beach & Mission road and will accept transfers from that line, as well as from the Powell-street cars.

—Fire at Healdsburg, Sonoma county, November 2d, occasioned the following losses: John McDonough, Sotyome Hotel, damaged and loss $10,000, insured for $8342; F. A. Haas, dry goods, $1700, insured for $5000; J. F. Grater, two buildings, $3000, insured for $1000; Grabner & Urhan, bakery; $1200, insured for $600; S. J. Ham, saddlery and barness, $1000; L. O. Walh, saloon, $1100, no insurance; Sam Meyer, general store, $500, insured; A. Thuman, jewelry, $200, insured; F. Steinback, harber, $125, insured; I. Novinsky & Co., general store, $200, no insurance; F. Koenig, $500, insured; Cummings Brothers, livery, $100, insured; G. Kunz, variety store, $125, insured.

—The State of Washington University regents have decided to advertise for plans and designs for the main building of the new university on the Lake Washington site, to be presented not later than Feb. 17, 1894, as provided by the law passed at the last session of the legislature. This law provides for premiums for the three best plans and designs, the first prize to consist of the acceptance of the plans offered and the appointment of the winner as architect of the building, the second to consist of $1000 and the third of $500. The law provides for the erection, first, of the main building, which is to be capable of enlargement, and then for other buildings for the use of the professors, students and employes.

—An important contract has been filed in the San Bernardino County Recorder's office in which the Semi-Tropical Land and Water Co. undertakes to furnish the Rialto Irrigation District with 301½ inches of water from what is known as the Meek's Mill property and 348½ inches from the Lord place; also to construct pipe lines and lateral pipe lines for the distribution of water over an extensive area of the orange belt in and around the town of Rialto. In consideration of the water and pipe lines the Irrigation district turns over $500,000 in irrigation district bonds, which have been deposited with W. S. Hooper, cashier of the San Bernardino National Bank, as trustee for both parties.

—Judge Stallcup of the Tacoma, Wash., Superior Court has appointed Josbua Pierce receiver for the Fidalgo and Anacortes Railway Company, upon the application of F. L. Blatner, a creditor of the concern. The application states that an execution has failed to discover any assets that can be levied upon, all the land being held under mortgage by the California Safe Deposit and Trust Company as security for its guarantee of $100,000 worth of bonds issued by the railway company. The personal property, consisting of steel rails, the electrical equipment and machinery, is alleged to be held under lien by several manufacturing companies. Several years ago the company built an electric road between Anacortes and Fidalgo bay, on Fidalgo island, the distance being about nine miles. The line has never been operated.

—The Consolidated Piedmont Cable Company of Oakland is in the hands of a receiver. The direct cause of the attachment and the subsequent appointment of a receiver is the fact that on November 1st $30,000 was due as the semi-annual payment on $1,000,000 worth of the first mortgage bonds of the company. The corporation defaulted on the interest payment, and the result was the application for the appointment of a receiver by the trust company as the representative of the bondholders. The Consolidated Piedmont Cable Company was organized and filed articles of incorporation April 19, 1890. The capital stock was $2,000,000, and the incorporators were Phebe A. Blair, E. A. Heron, Wilson R. Morse, Oakland; Montgomery Howe, Samuel Howe, Alameda County; Daniel Meyer, Ira Bishop, San Francisco. The paid-up capital stock was $17,500, of which each incorporator subscribed $2500.

—The passenger department of the Southern Pacific has issued a Midwinter Fair circular of information for intending visitors, calling attention to special rates which have been made to San Francisco and return during the Midwinter Exposition, from Portland, Or., Ogden, Utah, and El Paso, Texas, including intermediate stations, and stations on local lines of the Southern Pacific Company, Pacific system. These rates are as follows:

Class A.—Half fare or one-way rate for round trip, with $2.50 added, from all stations located over 300 miles from San Francisco.

Class B.—One and one-fifth fare for round trip, with $2 added, from all stations located over 150 miles (not to exceed 300 miles from San Francisco).

Class C.—One and one-third fare for round trip, with $1.50 added, from all stations located within 150 miles from San Francisco.

The minimum special rate will be $1.

Entrance ticket coupons to the fair grounds will be sold with the railroad special tickets as follows: For Class A, five gate coupons; for Class B, four gate coupons; for Class C, three gate coupons.

The return portions of these special tickets will be limited to stay in San Francisco as follows: Class A, over 300 miles, ten days; Class B, over 150 miles, seven days; Class C, less than 150 miles, five days.

These special tickets will be limited to continuous trip (*i. e.*, without stop-over privileges), both going to and returning from San Francisco. In addition to the above individual special rates, chartered cars can be secured under company's rules and regulations.

Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MACHINERY BOUGHT.—*Record*, Oct. 26: Dr. Boydson, who is operating the Pioneer mine at Plymouth, has purchased the hoisting and mill plant from the Empire company at that place and will erect the same on his mine.

James Burdon and others are sinking for gravel a mile west of Plymouth.

The Irma mine, in the Pioneer district, has closed down temporarily. Things were not in very desirable shape to carry on operations through the winter months, and consequently it was deemed best by the company to suspend work until February.

Last Friday 34 liens were filed on the Clinton mine and property. The total amount involved is about $3000. Silas Penry is attorney for the claimants. There is but little doubt that these claims and all other indebtedness will be paid off in a short time and then work will be resumed at the mine on a more substantial basis than heretofore.

Voorheis & Barney are repairing their chlorination works in Drytown and expect to be ready to start up next month.

At the Gover mine a new ledge was struck on the 800-level last week, lying between the old ledge and the footwall. The new find is five feet in thickness and the rock is rich, being of a ribbon character and showing plenty of free gold and sulphurets. It is looked upon as a very important development. The damaged shaft is nearly repaired. New morter blocks are being put in the mill—in fact a general repairing is going on in both mine and mill. It is expected to resume crushing about the 1st.

At the Wildman mine they are making excellent headway in sinking, having gone 20 feet last week. It is expected to sink 200 feet, or to the 1300-level, before stoping is begun. The pumps and everything about the mine are working smoothly, which accounts for the rapid progress being made.

At the South Eureka mine the contractors are driving ahead the drifts on the lower level.

Kern.

RICH PLACER STRIKES. — *Chronicle*, Nov. 7: Kern county's mining boom still continues. I. N. Chapman, at one time a United States surveyor, is now in town preparing for a return to the diggings. These are on the desert side of the Sierra Nevada mountains, about 30 miles north from Mojave. Mr. Chapman reports that the mines are very rich and that a great deal of coarse gold is being obtained. The country is waterless. Even the drinking water has to be brought to the miners in barrels. In consequence the gold is all "washed" dry. The gravel is shoveled into a machine like an ordinary grain-fanner. This is usually worked by hand. The gravel passes through several sieves of different sizes and the dust is blown away, only the gold falling to the bottom.

The mines are in the same township as the town of Kane's Springs. Most of the miners are working in the gravel beds in Goler creek and Jawbone canyon. It was in the former that J. S. Reed found a 56½-ounce nugget a short time ago. This single lump of gold is worth over $1000.

The pay gravel is not only in the canyons and creek beds, but all along the base of a high mountain range which occupies the western part of the township. It is from the rich quartz ledges in the high range that the gold comes. While the country is without rain there are sometimes cloudbursts. These carry whole hillsides down into the valley. In this way the gold was washed into the gullies. There are now 600 men at the mines.

Mariposa.

THE HITE TO REOPEN.—Mariposa *Gazette*: Mr. Bert Morgan is here representing the McCaw Company, who have obtained possession of the Hite mine. Mr. Morgan has engaged several men for a while until he can ascertain just what is needed in and about the Cove, but within a month he will have a large force at work on the road and about the mine. The McCaw brothers are shrewd business men and practical miners, and own and work one of the largest quicksilver mines in the State—the famous Cinnabar mine in Trinity county.

Mono.

TO TEST ORE.—Bodie *Miner*: The men employed at the Summit were drafted this week. A test run of ore is now being made at the Bodie mill, and if the result shows that the ore can be worked profitably the men will be returned to work. There is undoubtedly quite an ore body in the Summit, and if it can be made to yield paying returns it will prove a help to the camp.

Nevada.

NEW DISCOVERY OF GOLD.—*Telegraph*: Gold has been discovered in the Crown Point mine, owned by Mr. A. Ganthier of this city. The discovery was made to-day by John T. Polkinghorn and James Yonlton, two experienced and practical miners. The ledge is about 60 feet northeast of the main ledge, three feet thick, showing free gold, sulphurets and galena.

Mr. Polkinghorn first discovered the apex of this vein over 40 years ago, in the spring of 1853, while working on a gravel diggings on Wolf creek. At that time there was but little attention paid to quartz mining and Mr. P., like many other miners, passed it by carelessly. While living in the East he frequently thought of this fine prospect and determined he would embrace the first opportunity of developing this ledge. Finally he formed a partnership with Mr. Yontlon, and they entered into a contract with Mr. Ganthier to make the discovery and they succeeded in finding it in three days.

Work will be commenced immediately, pumping out the water of the main shaft down below the 200-foot level and then crosscut into the ledge.

TO BE STARTED.—*Transcript*: Albert D. Allan, owner of the well-known California mine, upon which little work has been done for many years, has decided to start it up. He will commence immediately in erecting new hoisting works and will crowd developments in the mine.

BODORT & MILL.—*Transcript*: Fred Zeitler, superintendent of the Champion mine at Nevada City, and a large stockholder in the St. Gothard quartz mine at Columbia Hill district, says that the latter company have purchased the mill of the Delhi quartz mine and will remove it to the St. Gothard immediately. As soon as it is put in place a large number of men will be employed and the mine worked on an extensive scale. It is believed that the mine, when thoroughly opened, will be equal to any one ever worked on that ridge.

THE HUDSON BAY.—*Telegraph*: The recent development in the 150-foot level of the Hudson Bay mine has been of sufficient importance to warrant the company again sinking their main shaft. The recent development in the Rocky Bar ground by the tribuners now proves beyond a doubt that there are two parallel ledges running through the Hudson Bay; its new shaft has been sunk 160 feet deep, and 25 feet deeper will strike the first ledge, a fraction deeper of 10 feet will encounter the second ledge, while it is undoubtedly the north end of the celebrated Ford & Mullen ledge that produced so fabulously in early days. All the mines on the North Star or French Lead will before long be in active operation, and the ledge of the Hudson Bay cannot be more desirable. Before long both ledges will be cut by the shaft, and great developments are expected.

Placer.

MINE SOLD.—*Sentinel*: The Moody Bros., at Gold Run, have sold their mine, the Gold Ring, to an Oakland company, of which Thos. F. Graher is the head, for $12,000. The sale was negotiated by Bert Moody and James Gayety. The Gold Ring is a good gravel mine and $15,000 has already been taken out by the former owners. The gravel worked by them was a soft stratum, but underneath this is a blue cement gravel which they were unable to work on account of not having a mill. The *Sentinel* says the new owners will put up a stamp-mill immediately and work this cement, which prospects very well.

John Spaulding has about 15 men at work building the dam at Dutch Flat for the working of the Polar Star mine, if the Debris Commission accepts the work.

George Woods, who has charge of the Foss mine at Lowell Hill, is pushing the prospecting work and is preparing the mine for drifting in the spring.

Sacramento.

A $30,000 CLEAN-UP.—The Folsom *Telegraph* tells how D. W. Burnett, near Salmon Falls, lost a fortune by leasing a piece of his farm on the American river to Chinese for $150, which he considered so much clear gain. The riverbed at that point had never been worked, and the wily Chinamen knew better its value than did the "old-timers." They cleaned up fully $30,000.

Sierra.

A LONG TUNNEL.—Pinmas *National-Bulletin*: Horace Taher of Gibsonville spent a couple of days in Quincy last week—Thursday and Friday. Mr. Taher has a force of men employed in driving a tunnel into the Gibsonville ridge to tap the big gravel channel there. During many years past, he has labored to accomplish this result. The tunnel is now in over 2500 feet, and it is expected to break into the gravel channel any time. The month of the tunnel is just below Gibsonville on the La Porte road, and from no other point could the ancient and rich channel of Gibsonville ridge be tapped at so short a distance. Mr. Taher's claims are situated just above those of the Thistle Shaft Company, which are understood to be producing large quantities of gold, though at considerable expense for hoisting, etc. Through the tunnel which Mr. Taher is now running, not only can his own claims be worked (and they embrace one mile of the ridge), but the tunnel is the key to that part of the channel lying above his claims. The moment Mr. Taher taps the channel, he will have one of the largest and best mining propositions in northern California.

Siskiyou.

GOOD RESULT.—Scott Valley *News*, Nov. 4: Tailings from an old arrastra were worked by the Crawford mill owned by A. G. Myers, and yielded about $4 a ton. This shows a great saving in handling the ore by the new process, and is a matter worthy of the consideration of miners who desire to obtain the best results.

MINING NOTES.—*Journal*, Nov. 1: Boyle & Co. are taking out rich quartz lately from their ledge at the head of the North Fork of Humbug, and are also engaged in running a tunnel to strike the Spencer ledge some distance below on the same fork.

White & Co. have struck a fine two-foot ledge on main Humbug creek, about a quarter of a mile below the forks, and feel confident of realizing good pay.

Burgess & Co. will soon commence opening a rich ledge on Pinch creek in Humbug district, which is considered one of the best ledges in that section. They contemplate putting in an overshot wheel for hoisting to better advantage than by hand power. The sulphurets found in this claim are exceedingly rich, and a good method of separating the gold therefrom is another matter requiring scientific attention.

At the Greenborn blue-gravel mine, near

Yreka, the cool nights allow more water lately for washiug purposes, and the claim is constantly paying better. Jnst as soon as rains commence, the force at work can be donbled toward realizing better proportionate resnlts. With an abundance of water, three shifts can be employed in the place of two as at present, in order to utilize every minute of the 24 hours of each day, in place of 20 as at present.

H. B. Van Vactor, the solid and eubstantial miniug man of tbe firm of Van Vactor & Staples, was in from the Siskiyons last week. They made a partial clean-up iu their ten-stamp mill now in active operation at Hungry creek, the contents from the plates and concentrator working $10 per ton. The ore they are now running on shows np handsomely on the plates, and is expected to work $20 per ton. The expense of mining and milling now costs them only $1.75, and they will soon have it so reduced that it will cost bnt $1 per tou for mining and milliug. Mr. Van Vactor says their Sterling ledge is an eight to ten footer; their Coyle ledge is also wide, and there is no doubt they have one of the finest miuing propertiea in the country. W. H. Mowat, Fred Denny and J. L. Coyle have a promising ledge in the same vicinity, that Mr. Van Vactor says looks like a fine prospect from the work done.

James E. Smith's quartz mill is ready to commence work this week on the mine he bonght of Pearsou & Crowson near Hornbrook.

Ventura.

PIRU MINING DISTRICT.—TO THE EUITOR:—The mining outlook in this district is improving and mining men are beginning to pay some attention to our mineral wealth. Several parties have been looking over this mineral belt. There also have been several placer claims located in this district in the last few weeks. Mr. Fowler, on the San Gillmo creek, bae located eeveral for himself and others. He is goiug to put in a hydraulic plant, so he informs the writer. He also etates that he hae made from $1 up to two ounces per day with a very small eluice-head of water. An old man and his son, two miles south of the Frazier mine, are working in a small dry gulch aud are taking out eome very good gold nuggets worth from 50 cents to $12 They have no water, but do their dry-washing with a pan. There is no doubt bnt that there is much good placer gronnd in thie district. I have cleaned up two ounces in a day's work on Rattlesuake gulch, one mile below the White Mule mine. Of couree, that was an exception, but it shows that there ie placer gold iu paying qnautities here. The great drawback is water; it is very scarce in most of the places that prospect the best.

Mr. Robb is still working on his mica miue, aud I am informed that the mica improves in quantity and qnality as depth is attained.

The Frazier Miuing Compauy have put meu to work on their mine again. I think that all the miue lacks to make it a good paying property is a thorough, practical aud experienced mining and mill man.

Mr. S. Beach has been working the Beach & Colldiott mine, situated a short distance north of the Frazier mine. He has bought ont two of his partners and now hae control of the miue. He has ruu several tons through au arrastra and the ore paid very well. He will put in a mill next spring, if nothing happens.

John Foley has been running ore from the Irish Republic throngh a one-horse arrastra and it paid $100 per ton in gold. The vein is five feet wide, but the richest ore is in the center of the lode and is about one foot in width.

D. M. Menzies has purchased the half interest owned by Wm. Meuzies in the Brown mine. D. M. saye that the Brown is showing up finely, there being plenty of ore wbich will go $12 and over per ton.

George Haylock has struck the Bunker Hill lode at 80 feet below the upper workiugs, some of the quartz showing gold to the naked eye. It is the intentiou to put up a mill on the claim, or near it, early next spring. The vein is 80 feet wide on the snrface, but how wide it is 80 feet below is not knowu yet, as Mr. Haylock has not cnt across it yet.

The White Mule mine has been shut down eince last spring, and Mr. J. P. Bergeron has purchased a three-fourths interest in it. He had a chemist come up to try the ore by the cyauide process aud it proved excellent, only one-tenth per cent being required to extract 98 per cent of the gold. The chemist's name is Cbarles Metcalfe, a man of many years' experience in the working of metale, and also in the sampling, buying and selling of all kiuds of ores. He is acquainted with Almarin B. Paul, from whom he got eeveral good ideas about the cyanide process.

J. P. Bergerou is in a big coal discovery out near Gober district, northeast of Mohave station on the Southeru Pacific railroad. The writer has prospected from Siskiyon to San Diego, has been in Califoruia siuce 1863, and has heard of hundreds of big coal strikes in the State in that length of time, but no good coal has ever been found. I have no faith iu that any will be found in southern California.

Ventura, October 28, 1893. I. H.

Yuba.

STARTED UP.—*Democrat*: The Excelsior Water and Mining Company have reenmed hydraulic mining under the provisione of the Caminetti law, and every one in that section ie jubilant over the outlook for Smartsville and vicinity. The company have complied with all the requiremente of the law. The workings of the mine are open to the inspection of all, and eepecially are the valley folks invited to come to Smartsville and view the plan that impounds the tailings of the Blue Gravel mine.

NEVADA.

Eureka District.

DOC HARRIE' STRIKE.—Eureka *Sentinel*: Doc Harris has a lease on the Friday, one of the miues of the Hamburg series, and is doiug first-rate. He says he is making four shipmeuts of ore per month, a shipment consisting of 15 tons. The ore averages about $40 in gold and two or three ounces in silver per ton. Doc says where he commenced work, previons to striking this ore body, there were no more indications of ore to be seen than are to be observed in the monntains east of Eureka. Had the tunnel that ran into the body of ore been driven four feet higher or the same distance lower down the monntain he would have missed the bonanza that is rewarding him so handsomely now. He also says the iron which the ore contains pays for its working.

Kennedy District.

JENKINS' MILL.—J. R. Benton, who is in from Kennedy, informe the *Silver State* that work on Jenkins' mill is progressing rapidly, and it is expected that it will be ready to start up by December 1st. All the mines in the district are looking well, and if the mill works the ore successfully Kennedy will soon be a lively camp. There are now about 80 men in the dietrict. There is a weekly mail service from Winnemncca, and an effort is being made to have it increased to tri-weekly.

THE GRIZZLY RIDGE.—*Transcript*: The owners of the Grizzly Ridge mine, near Columbia Hill, will shortly begin work upon the property on a more extensive scale than ever before. This mine was formerly owned by P. McAnsland aud others, but has been sold to a San Francisco compauy. Fred Zeitler, superintendent of the Champion, is one of the principal stockholders. Some of the other owners have recently visited the mine and feel highly pleased at the outlook.

Some remarkably rich ore has been taken out of this mine at different times, and there is a good ledge of ore in the tnnnel from which rock enough can be takeu to keep a mill going steadily. It is the intention of the present company to put up a mill and other machinery right away.

Mardis District.

GOOU PEOSPECTS.—Elko *Free Press*: Mardi, district is coming to the front at a lively rate and next spring will nndonbtedly witness quite a little settlement there.

Hall & Hamill are putting up a gold-quartz mill on Copper creek and constructing a big ditch to take water from the head of Copper creek, with which to run the mill. Their quartz lead is developing well, and prospecte are good. Joe Hall has purchased the Dorsey hay ranch on the river, and is erecting a dwelling honse for himself and family.

McCullongh and McLaughlin, who own the Union Gulch placers, have bouded their claims to Denver parties, who are bringing in a large ditch from Copper and 76 creeks to the diggings. They have laid out a townsite on Union Gulch, aud are doing considerable other preparatory work. They evidently mean busiuess, and will have a good-sized camp there in the near futnre.

ARIZONA.

THE SILVER KING.—*Citizen*: The Silver King mine of Pinal county, in its time one of the greatest silver properties in the world, is now probably abandoned. Former miners of the property know where good veius are yet uutouched, but geuerally they are impracticable to reach. Often they are behind waste stored in unnsed chambers instead of beiug taken to the snrface and thrown out on the dnmp.

The King mine made several men rich and kept a large force employed for years. The mine was practically all developed with its own contente, no outside capital going into it.

In the great hollow depths of the mine, where one may wander for hours, is a whole forest of timber. A former miner estimates that a million dollars' worth of timber is buried in the Silver King. It is hardly worth the removal, however. The same ie the case with the engines. Their removal would almost offset their value.

Of all the men connected with the mine, one, or two at most, are wealthy to-day. It is even said that uone of them are "worth anything" to-day, financially speaking.

PLENTY OF GOLD.—Tombstone *Epitaph*: E. W. Storrs is in from Miller canyon, where he and his partner, Wickersham, are workiug a gold property. This particular mine was owned by the latter for 12 years but no work of a remunerative nature has been done on it until this year. A carload of ore which will run 50 per cent lead and $50 in gold beside 10 ounces in silver is on the dump and will be shipped this week. The ledge can be traced for miles and is strong and well defined. Four miles from this mine is the group being worked by Lusk & Connor. The latter has been over to the Superstition mountains near Phenix but has returned home convinced that he has the making of a bigger mine on the summit of the Huachuca mountains and work will be pushed again. The gold mines of the Hnachuca mountains are attracting much attention at the present time.

A FINE OF MARBLE.—Phœuix *Republican*: A discovery has been made near the Verde, about 75 miles northeast of the city, which will prove much more valuable than the average gold mine. It is an almost limitless deposit of marble of a high grade. Samples have been submitted to experte, who pronounce it euperior to the beet Vermont marble. The eamples are snsceptible of a high polish, which is taken easily.

BRITISH COLUMBIA.

THE OKANOOAN FIELDS.—Spokane *Review*, Oct. 25: "A mill rnn of eight tons of ore from the Triune mine was made a short time ago," eaid Mr. Del Hart, merchant, of Golden. "The result was the best ever obtained. It was ouly intended as a small grub enterprise, and two meu did all the work, mining the ore and milling it in three days. It netted them $160, or $20 to the ton. I have more faith iu Okanogan than any other mining region in the Northwest. Rest assured that Palmer mountain will make its mark not later than next spring. All that has ever been required was capital, intelligently employed, and the mines are so far advanced with this year'e development as to insure no further delay on that account.

The assessment work has been completed on 12 claims at the Spokane, indicating that the owners of that property have unlimited faith in its value, althongh operations were considerably retarded by the suspeusiou of banks in Spokane when the financial crash occnrred.

Work has been temporarily snspended at the Grand Summit, owing to a misunderstanding among the parties interested. Mr. Enright made some sort of conditional sale of his interest to his partners, and a dispute arose as to the particnlar part of the property to be worked and the method of doing so. Owing to the lateness of the season, there will probably be little more work done there until next spring.

"The season ie closing," Mr. Hart says, "with a better showing than ever before, and at no time in the history of the Okanogan camps have the people exhibited such cheerfulness and confidence."

The weather continues fiue and many prospectors are etill at work in the hills. So far ae heard from, their expectations have been very generally borne out by the summer's operations, and extraordinary efforts will be exerted in the way of development on a larger scale next season. Few are anxious to sell, yet there will be opportunities for capitalists who know a good gold property when they see it to obtain interests on very reasonable terms, as the miners realize the benefit of enlisting men of meaus to more rapidly and systematically open the mines and begin production.

OREGON.

AT THE GOLDEN EAGLE.—Ashland *Tidings*, Nov. 3: The latest mining sensation in local circles is the rich strike made iu the "Golden Eagle mine on Williams creek, owned principally by Ashland people. R. M. Garrett and Jack Garvin, part owners of the mine, who had been there for a week or two, returned last Saturday with some ore that lifted the eyes out of the sockets of the beholders. They had a sack of ore weighing about nineteen ponnds. They had already waehed out of it without crushing a bunch of nuggets worth abont $150. The rock wae mortared in Ashland and yielded another hundred dollars. The tailings also carried plenty of fiue gold which they had to catch by amalgamation. The ore was taken from a 30-foot prospect shaft iu a ledge abont three feet wide. It was located last spring by Robert Neal of Wagner creek and Fred Mallen, and has been sold by them to a company composed of Jack Garvin, R. M. Garrett, Jndge Tolman, Crit Tolman, R. Beswick, J. H. Martin, Capt. Ingalle of Portland, and Dr. Van Hasslocher of Paris. It is located on Williams creek, within half a mile of the "Bone of Contention" mine owned by Smith & Booth of Grante Pass, upon which there is a stamp mill. The company have three ledges, one larger and another smaller than the Golden Eagle, and all lying parallel. The claims are on a ridge cnt by the gulches from which hundreds of thousande of dollars were taken years ago in the rich Williamsburg diggiugs, and the men who have made this strike of rich ore think they have lots of it within their claims. They will make arrangemente soou to work the mine through the winter.

The Ashland mine, the foundation of all the mining activity about Ashlaud, continues to tnrn out its regular monthly divideuds.

Geo. F. Gund, the Seattle member of the firm of Guud & Edwards, arrived in Ashland laet Friday, accompanied by Geo. T. Milliken, the expert who was here last snmmer. In company with Mr. Edwards they have pnt in the present week examiniug the Hope mine and other properties in which Gnnd and Edwards are interested.

Snowgoose Brothers, who came in from Klamath county late in the summer, and one of the Wertz boys have several quartz claims in the Siskiyous, near the railroad, which show good prospects. They are fixed with bnildings, etc., for winter weather, and intend to keep right at work, regardless of wiud, rain or snow.

J. W. Briner is still at work prospecting his cinnabar claims up near the head of Applegate, and from samples of ore which he took over to Philip Mullen last week to test he is satisfied that he has one of the best cinnabar prospects unearthed in this region.

J. F. Dnffy has struck a very promising lead of cinnabar in the prospect tunnel which he is running on the claims near the McCall & Anderson mine, and is uow drifting along the vein and taking out some ten per cent cinnabar ore.

THE ILLINOIS PLACER COMPANY.—*Oregonian*: Among the recent arrivals in Captain George A. Pease, who has just been looking after his interests in the Althouse district. He reports that the most promising placer prospect there is owned by the Illinois Hydraulic Mining Company. It is situated about 60 miles eouth west of Grant's Pass, in Josephine county, and is in the heart of the Siskiyou mountaine. About 30 years ago it was worked by a couple of Germans. After several good finds they came upon a piece of quartz which netted them about $1200, and satisfied with their haul they left the country. The big hole which they dng in the mountain side was partly filled by a mountain elide, and it was in that condition when H. L. Doney and Dr. J. M. Taylor, while on a prospecting tour, found the claim abont July 1 last. They waehed out eome rich dirt, and picked up several good-eized nuggets before leaving the place. Eight claims, covering about 160 acres, were etaked out on the property, aud a compauy formed to work it. An abundance of water can be obtained from Boulder and McDonald creeks through pipe lines about 600 feet in length, bnt reservoirs mnst be bnilt to keep up the snpply all the year round. While digging a ditch the workmen picked up $600 worth of small nnggets, and again, while eluicing out a portion of the old tunnel, 20 feet in length and 4 in width, 20 ounces of small nuggets and coarse dnst were picked up. There are now en ronte for the miue a hydraulic "giant," some smaller machines and a large amount of piping, all of which, it is expected, will be in place before the snow falls. No attempt has yet been made to estimate the value of the dirt, for the owners of the mine believe they have eometbing better on hand than the placer mine. About 350 feet up the mountain side they have discovered a well-defined ledge from which, they believe, the gold in the placer below has been washed. It is the intention to sluice out all the debris below this ledge, laying the rock bare, before working on the ledge itself.

MINING NOTES.—Jacksonvile *Times*, Nov. 3: Since the arrival of the Huntington mill at the Golden Fleece mine near Ashland, attention has been attracted to that locality and several pieces of land near have been bonded.

Lon. Edwards has his men at work at the Hope mine, which was bouded a short time ago by Gund & Edwards. They are cleaning out the old prospect shaft at a point near the dividing line of the "Hope" and "Shorty" claims. The shaft was filled np with waste by the men who worked the mine last. After it is cleaned out and retimbered it will be eunk deeper npon the ledge, in prospect work.

Phil. Miller, who is superintending operations at the Miller mines ou Farmers' flat is making preparations for the next season's run.

John Simons left Tuesday morning to commence operations on the Bailey mine ou Missouri flat, which has been bonght by a Portland syndicate.

Drew & Co. are about to put up a five-stamp mill on the quartz ledge which they recently pnrchased from G. R. Hammersley in Jump-off-Joe district.

Jos. Wolfstein aud J. Weill have located 40 acres of mining ground near the Oregon line and have acquired water rights on Dutch creek, a tributary of Elliott creek.

Messrs. Poppleton & Bishop, the gentlemen owning the dry-wash machine which was given a successful trial at Al. Sturgis' claim this week, have bonded the Owen's claim in Jackson creek district and will put a force of men to work on the mine as soon as possible. The machine ie evidently a snccess and will make it possible to work many claime in this section, which have not paid before on account of lack of water.

GOOU PICK-UP.—Baker City *Democrat*: A couple of prospectors at tbe First Natioual Bank have exchanged fonr and a quarter ounces of virgin gold for three shining twenties and eight "cart wheel" dollars. They informed the cashier that the amonnt was realized from several pieces of float picked up about six miles east of the city which was pounded out in a small hand mortar, the work ouly requiring abont au hour.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreigu Patent Agency, the following are worthy of special mention:

SLOT BRAKE FOR CONDUIT RAILWAYE.—No. 507,366. Dated Oct. 24, 1893. Wm. M. Hood, of San Francisco, Cal., assignor to the Pacific Cable Railway Company, same place. This device consists of a laterally expansible and contractible brake shoe or piece, traveling in the slot of the conduit, and adapted by its expansion to form frictional contact therewith, and by its contraction to relieve itself. In detail the brake shoe or piece is composed of a central section and two end sections. These are moved into line to relieve the brake, and are moved in opposite directions to expand it and cause it to bear on the walls of the elot.

CAN-MAKING MACHINE.—Robert D. Hnme, Gold Beach, Oregon. No. 506,878. Dated Oct. 17, 1893. The object of this invention is to complete metal cans from the flat sheets of metal, eolder the longitudinal seams and apply the head to the finished can in a single operation. The metal sheets are delivered from a table to cutters, by which they are accurately seized, then advanced over a former after having the interlocking edges turned, the former giving the sheets a cylindrical shape, after which the edges are interlocked and closed, the seam soldered, and finally a head is placed upon the end of the can thus completed.

SHOULDER CUTTER FOR VEHICLE AXLES.—Joshua Sovereign, Woodland, Cal. No. 507,389. Dated Oct. 24, 1893. The object of this invention is to provide an apparatus for cutting shoulders npon the outer ends of vehicle axles and a means for accurately adjnsting and centering the apparatus upon the axle to be cut. It consists of a sleeve of larger diameter than the axle, and tapered correepondingly. Another eleeve ie turned to fit the interior of this larger sleeve, and the interior of the inner sleeve is tapered eo that when it is slipped into the onter sleeve the taper socket clasps and fits the end of the axle and thus accurately centers it within the outer eleeve. Set screwe paseing radially throngh the outer sleeve are turned in until they bear againet the axle and hold it central, after which the inner eleeve is removed. The cutter holder is then fitted upon the end of the sleeve, which ie fixed to the axle and ie adapted to revolve upou it. The cutter ie fitted to elide in guides upon the holder, and may thns be advanced toward the center of the axle and as far from the end as it is desired to form the new shoulder.

Market Reports.

The Markets.

SAN FRANCISCO, Nov. 9, 1893.

The trend of silver prices in New York and London during the week has been upward. So far as the cessation of silver purchases has had effect, it has knocked off less than five cents from the price in New York, and in London it might almost be said to have had no effect at all. The strong force in upholding the silver market is now said to be the Russian Government, which contemplates adding silver in large volume to its coinage.

Silver and the Metals.

NEW YORK, Nov. 9.—Following are the closing prices for the week:

	Silver in London.	N. Y.	Copper.	Lead.	Tin.
Thursday	32	69	9 75	3 30	20 70
Friday	....	....	9 75	....	20 70
Saturday	32⅛	69¼	9 75	3 30	20 70
Monday	32⅜	69⅜	9 65	3 60	20 65
Tuesday	32½	....	....	....	....
Wednesday	32¾	70¼	9 65	3 30	20 65

San Francisco Metal and Coal Market.

ANTIMONY.		**QUICKSILVER.**	
Per lb	— @ 13	Home trade, pr. flask	40 50 @41 00
BORAX.		**STEEL.**	
Refined, in car lots	— @ 7½	English, lb	— @ 18
Powdered, do	— @ 7½	Canton tool	— @ 8½
Concentrat'd, do	— @ 6½	Bl'k Diam'd tool	8½@ 15
All grades jobbing at advance.		Pick & Hammer	6½@ 10
COPPER.		Machinery	4 @ 5
Bolt	23 @ —	Toe Calk	— @ 4½
Sheathing	23 @ —	**TIN.**	
Ingot, jobbing	— @ 20	Spot, lb	21½@ 22
Do, wholesale	15 @ 16	**COAL.**	
IRON.		SPOT FROM YARD—PER TON.	
Bar, base	— @ 2½	Wellington	$8 00
Norway, base	— @ 4½	Greta	7 50
PIG IRON.		Nanaimo	6 50
	Spot.	Gilman	6 00
Egliuton & ton	—@—	Seattle	6 50
Olengarnock	27 00@—	Coos Bay	5 50
Am. Soft, No. 1	25 00@—	Cannel	9 00
Shotts No 1	27 00@—	Egg, hard	12 00
Puget Sound	—@—	Wallsend	7 25
Clay Lane White	30 00@—	Scotch Splint	8 00
Langloan	27 00@—	Brymbo	7 50
Gartsherrie	27 00@—	West Hartley	7 50
Barrow	—@—	TO LOAD—PER TON.	
Cargofleet	—@—	Australian	6 50@—
LEAD.		Liverpool Steam	8 87@—
Pig	— @ 4½	Scotch Splint	7 00@—
Bar	— @ 5	Cardiff	7 00@—
Sheet	— @ 6	Lehigh Lump	10 00@—
Pipe	— @ 5½	Cumberland	8 50@—
SHOT.		Egg, hard	9 00@—
Drop, sizes *smaller* than B, ℔ bag of 25 lbs	$1 75	West Hartley	7 50@—
Do do, B and *larger* sizes ℔ bag of 25 lbs	2 00	**COKE.**	
Buck, Balls and Chilled do, ℔ bag of 25 lbs	2 00	English, to load	$9 50@10 00
		Do, spot, in bulk	—@12 00
		Oo, in sacks	—@14 00
		Cumberland	9 50@—

Mining Share Market.

SAN FRANCISCO, Nov. 9, 1893.

The past week has been exceedingly active in the mining share market. The brokers report that the volume of business has heavily increased, and the record of transactions amply hears out their statements. Last Saturday was almost a red-letter day, no little excitement being created. Advances were very sharp. Compared with the previous day, on the San Francisco Stock Exchange, the advances were: California advanced 70c; Best & Belcher 40c; Nevada and Ophir each 35c; Challenge 25c; Mexican, Confidence and Jacket each 20c; Union, Curry, Norcross and Potosi each 15c; Savage, Chollar, Crown Point and Belcher each 10c; Alpha and Overmao each 5c.

The record of sales for the week was:

October 30, shares	12,230
October 31	18,670
November 1	14,415
November 2	15,845
November 3	22,180
November 4	18,750
Total	102,090
Previous week	95,190
Week ending Nov. 5, 1892	77,690

The activity in the market has continued during the present week. Besides Consolidated California and Virginia and the other leading north-end stocks, Yellow Jacket and some of the other Gold Hill stocks have been in brisk demand at a sharp advance. It has been reported for several days that the Sharon-Newlands interests at Gold Hill would be given more attention.

Below is an official statement of the sums disbursed to employes of Comstock mining companies for services during the month of October:

Andes	$900 00
Hale & Norcross	2,088 00
Con. Cal. & Va.	9,697 50
Ophir	2,099 75
Mexican	2,099 75
Best & Belcher	1,854 50
Gould & Curry	1,129 00
G. & C. and B. & B. shaft	124 00
Occidental (estimated)	1,500 00
Belcher	2,017 00
Crown Point	756 00
Confidence	100 00
Challenge	100 00
Yellow Jacket	2,049 00
Justice	797 00
Savage	5,100 00
Chollar	2,287 25
Potosi	6,116 50
Sierra Nevada	811 00
Union Shaft	2,170 50
Ward Shaft and Bullion	1,063 00
Nevada Mill	2,500 00
Electric Light Co	500 00
Outside quartz mills (estimated)	7,000 00
Water Co	3,000 00
Total	$57,949 75

The payrolls continue to drop, they are $4974.50 less for October than for the previous month. This is a better showing than was made in September, however, when there was a drop of nearly fourteen thousand.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, November 9, 1893.

9:30 A. M. SESSION.

100 Alpha	15c	800 G Prize	5c
4000 Alta	10c	1800 H & N	95c
200 Andes	75c	300	90c
100	70c	600 Justice	25c
500 Belcher	95c	2050 Kentuck	25c
200 Bodie	30c	300 Mexican	1 45
100 B & B	2 85	400	1 50
200	2 90	100 Mono	20c
1010	3 00	250 Occidental	30c
650	2 95	50 Ophir	2 45
600 Bullion	30c	300	2 60
150	55c	150 Overman	45c
300 Challenge	75c	450	50c
1500 Chollar	95c	1100 Potosi	1 25
100	1 00	850 Savage	1 20
1320 Con. Cal. & Va	4 75	100	1 15
150	4 70	300	1 10
100	4 80	150 Scorpion	10c
250 Conference	2 00	100 Sierra Nevada	1 80
500 C Imperial	10c	150	1 85
200 Crown Point	95c	300	1 90
1350	90c	400 Seg Belcher	25c
300	85c	100 Union	1 40
200 Exchequer	15c	700	1 35
350 G & O	1 25	100 Utah	30c
350	1 30	1650 Yellow Jacket	1 40
550	1 35	100	1 45

2:30 P. M. SESSION.

330 Ophir	2 35	500 Alpha	20c
100	2 30	400 Belcher	95c
25	2 50	200	1 00
200 Mexican	1 40	350 Confidence	1 90
350	1 45	200 S Nev	1 90
300 Gould & Curry	1 30	200	1 35
150 Best & Belcher	2 80	200 Utah	30c
150	2 85	250 Bullion	60c
20	2 90	700 Exchequer	15c
195 C. C. & Va	4 75	1200 Seg Belcher	25c
200	4 80	900 Overmao	50c
300 Savage	1 10	250 Justice	30c
200	1 15	400 Union	1 40
800 Chollar	85c	350	1 35
400	80c	500 Alta	15c
650 Potosi	1 20	300 Silver Hill	10c
300	1 15	400 Challenge	75c
700 H & N	1 05	400 Andes	80c
100	1 00	150 N G & C	30c
200	1 10	600 E B & B	25c
950 Crown Point	95c	300 Bodie	35c
250	1 00	100 Mono	15c
900 Y Jacket	1 45	100 Scorpion	15c
100	1 40	800 Con New York	15c
550	1 50	500 Julia	5c
100 Kentuck	25c		

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING OCT. 24, 1893.

507,405.—HYDRAULIC ENGINE—F. Bernardi, Moketumne Hill, Cal.

507,409.—LUBRICATOR—G. W. Bovd, S. F.

507,480.—VEHICLE BRAKE—C. K. Brandenburg, Bly, Or.

507,425.—HAY PRESS—F. P. Fowler, Phoenix, A. T.

507,427.—HEADER—J. Garrett, Visalia, Cal.

507,436—GAS ENGINE—Hirsch & Schilling, S. F.

507,366.—SLOT BRAKE—W. M. Hodd, S. F.

507,370.—SIDE HILL VEHICLE—C. Koenig, Sacramento, Cal.

507,231 —GATE LATCH—L. D. Latimer, Windsor, Cal.

507,156.—CONVEYER BELT—R. Niedergesaess, Seattle, Wash.

507,232.—PLOW—J. L. Pearson, Lodi, Cal.

507,327.—MOTOR—B. L. Picaro, Centralia, Wash.

507,521.—CONCRETE PIPES—E. L. Ransome, Oakland, Cal.

507,238.—WINDOW SHADE GUIDE—F. C. Schroeder, Alameda, Cal.

507,339.—AXLE CUTTER—J. Sovereign, Woodland, Cal.

507,466.—WATERPROOF SOIT—O. Van Oostrum, Portland, Or.

507,468.—STEAM ENGINE—C. White, Oakland Cal.

507,193.—TRANSPORTING FLUID—J. S. Wintermute, Tacoma, Wash.

507,397.—LUBRICATOR—S. F. Woodworth, Clipper Gap, Cal.

FOR THE WEEK ENDING OCT 31, 1893.

507,876.—COIN HOLDER—E. Berrini, Portland, Or.

507,881.—HOP CARRIAGE—Cahill & Dickinson, Salem, Or.

507,885.—PORIFYING ASPHALT—A. S. Cooper, Santa Barbara, Cal.

507,973.—TONGS—J. W. Cox, Gold Hill, Or.

507,709 —SHEET METAL PIPE—C. S. Hamlin, Los Angeles, Cal.

507,542.—BAG HOLDER—G. Hunt, Walla Walla, Wash.

507,817.—CLOCK HAND REMOVER—C. G. Ingalls, Colville, Wash.

507,834.—BRAKE—D. C. McGregor, East Oakland, Cal.

507,630.—FLY TRAP—J. S. Morton, Los Angeles, Cal.

507,921.—CHAIR—W. S. O'Brien, S. F.

507,686.—CAR COUPLING—T. C. O'Donnell, Winnemucca, Nev.

507,926 —MINING APPARATUS—E. F. Peck, Napa, Cal.

507,845.—DRESSER—S. A. Richards, Fresno, Cal.

22,362.—DESIGN FOR WATCH CHAIN—J. Jenkins, Buckley, Wash.

Glass Curtains for Beds.

In the Paris Palais Royal there is being exhibited a novelty in the utilization of glass as an article of house furnishing. It consists in the introduction of glass curtains either for windows or beds. They are made of small squares of colored glass, each square being set in a small zinc frame, but probably the frame is a superfluity which, for the purpose of cheapness, could be dispensed with.

Assessment Notices.

GOULD AND CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Trustees held on the fourteenth day of October, 1893, an assessment (No. 72) of Ten Cents (10c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the company, Room 69, Nevada Block, 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 16th day of November, 1893, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on THURSDAY, the 7th day of December, 1893, to pay the delinquent assessment, together with the cost of advertising and expenses of sale. By order of the Board of Trustees.

ALFRED K. DURBROW, Secretary.

Office—Room 69 Nevada Block, Mo. 309 Montgomery street, San Francisco, California.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS

ASSESSMENTS.

COMPANY AND LOCATION.	No.	AMT.	LEVIED, DELINQ'T AND SALE.	SECRETARY.
Belcher S M Co, Nevada	47	20c	Nov 3, Dec 7, Dec 28	C L Perkins, Mills Building
Belle Isle M Co, Nev	19	10c	Sept 28, Nov 3, 24	J W Pew, 310 Pine
Best & Belcher M Co, Nev	55	25c	Nov 1, Dec 5, Dec 22	L Osborn, Nevada Block
Butte Belle C M Co, California	1	8c	Oct 11, Nov 15, Dec 6	Chas H Ford, Crocker Building
Caledonia G M Co, South Dakota	17	50c	Sept 13, Oct 16, Nov 15	F G Drum, Mills Building
Challenge Cons M Co, Nevada	15	5c	Oct 10, Nov 14, Dec 5	C L McCoy, Mills Building
Chollar M Co, Nevada	38	10c	Oct 9, Nov 14, Dec 7	Chas E Elliot, 309 Montgomery
Cons New York M Co, Nevada	11	5c	Sept 27, Nov 1, Nov 22	Chas E Elliott, Nevada Block
Con Wyoming G M Co, Nev	3	5c	Oct 3, Nov 13, Dec 2	W J Gurnett, 303 Pine
Crown Point G & S M Co, Nevada	62	10c	Sept 26, Oct 31, Nov 21	James Newland, Mills Building
El Leopoldo G & S M Co, Mexico	4	1c	Oct 26, Dec 1, Dec 18	Jabez Howes, 214 Pine
Evening Star M Co, Cal	11	4c	Oct 11, Nov 13, Nov 29	J Scoville, 320 Sansome
Gould & Curry S M Co, Nev	72	10c	Oct 14, Nov 16, Dec 7	Alfred K Durbrow, Nevada Block
Granite Hill M & D Co	1	1c	Oct 10, Nov 11, Nov 27	J M Wiley, Grass Valley
Gray Eagle M Co, Cal	34	5c	Oct 11, Nov 15, Dec 5	Chas C Harvey, 309 Montgomery
Hudson Bay Cons G M Co, Cal	1	10c	Oct 4, Nov 11, Nov 30	J H Sayre, 328 Montgomery
Idaho & Eureka N W Extension M Co, Cal	1	2c	Oct 14, Nov 14, Nov 30	Geo F Nourse, Sacramento
Julia Cons M Co, Nevada	25	5c	Oct 23, Nov 23, Dec 19	J Stadtfeld, 309 Montgomery
Kentuck Cons M Co, Nevada	7	10c	Oct 5, Nov 9, Nov 30	Aug Waterman, 309 Montgomery
Martin White M Co, Nevada	29	25c	Aug 31, Oct 26, Dec 14	K L Ross, 120 Sutter
Mt George M Co, Cal	3	1c	Sept 26, Oct 31, Nov 13	J M Thomas, Grass Valley
Occidental Cons M Co, Nevada	14	10c	Oct 9, Nov 13, Dec 4	Alfred K Durbrow, Nevada Block
South Eureka M Co, Cal	6	1c	Sept 13, Oct 24, Nov 23	Abraham Halsey, 328 Montgomery
St John Quartz M Co	8	5c	Oct 14, Nov 15, Dec 2	J M Wiley, Grass Valley
Teresa Mining Co, Mexico	12	10c	Oct 27, Dec 7, Dec 23	K J Willats, Flood B'l'g
Union Con S M Co, Nev	48	20c	Oct 3, Nov 3, Nov 29	Chas E Harvey, 309 Montgomery

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE
East Best & Belcher S M Co, Nev	Regular	C H Mason, 324½ Montgomery	Nov 23
North Gould & Curry G & S M Co, Nev	Regular	C H Mason, 324½ Montgomery	Nov 20
Occidental Cons M Co, Nev	Regular	Alfred K Durbrow, Nevada Block	Nov 20
Silver Lick Cons M Co	Special	W Ladd, 531 California	Nov 11

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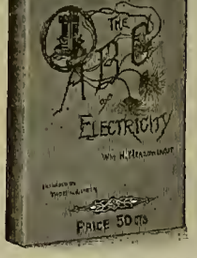

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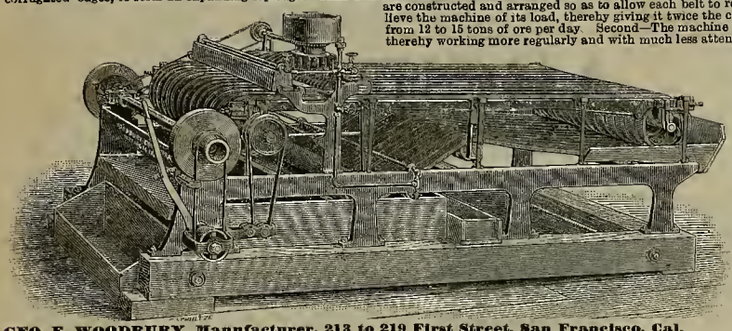

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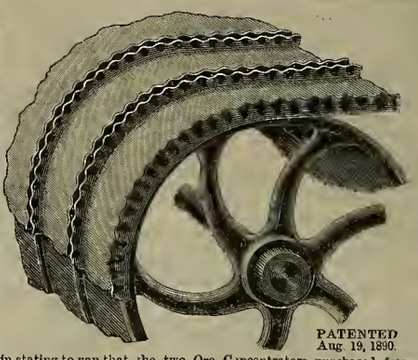

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An Illustrated Journal of Mining, Mechanics and Popular Science.

VOLUME LXVII.
Number 21.

SAN FRANCISCO, SATURDAY, NOVEMBER 18, 1893.

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SEVERAL inquiries have been received by the PRESS as to whether it is perfectly safe for locators on unpatented claims to suspend the usual assessment work for 1893. There seems to be some fear that some risk may be run, and that the claims may in some way be subjected to relocation by failure to perform the usual work. There is no danger. The provisions of the law are clear. There can be no mistake. No assessment work need be done this year in any State or Territory except South Dakota. But there is one simple condition that must be fulfilled. Claimants must file a written notice with the proper authority that they intend in good faith to hold and work said claim. This matter is vital. It must not be overlooked.

THE Waukesha gravel mine at Relief Hill, in Nevada county, was sold at a Commissioners' sale a few days ago and bid in for $3600. Before the hydraulic mines were stopped this mine was valued at over $50,000.

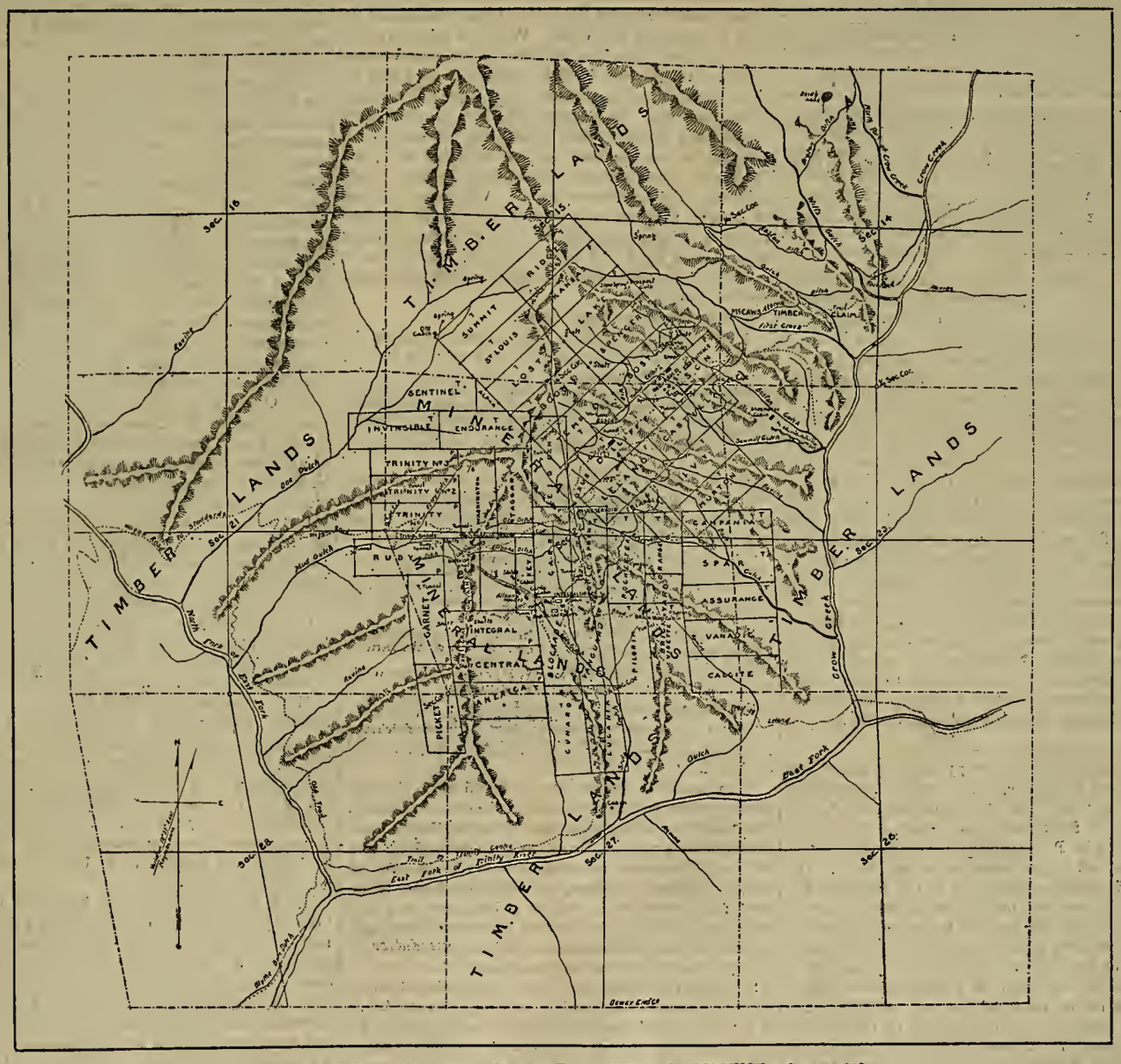
THE Executive Committee of the State Miners Association has placed in the hands of State Senator Tirey L. Ford, W. H. C. Maxwell and August Weihe authority to confer with the California delegation in Congress relative to the bill asking for $1,030,000 to construct impounding dams for hydraulic mines. A plan of campaign will soon be decided on.

THE President has, by re-appointment, fully corrected the oversight of the Senate in its failure to confirm the California Debris Commission. Official notice of the re-appointment has, however, not yet been received, but it is expected daily. The work of the Commission will suffer very slight interruption.

IT is said that Governor Waite of Colorado has made up his mind to issue a call for a special session of the Legislature before Christmas. The continued low prize of silver and the fixed opinion of Waite that there will be a further decline to 60 cents and a consequent paralysis of the silver industry of the State are the reasons assigned for the call.

THE Cripple Creek Railroad Company and the Colorado Midland Railroad Company are having a race in railroad construction to see which will reach the gold camp in Florence, Col., first. Thousands of tons of paying ore lie dumped at Florence awaiting transportation to smelters and mills.

W. H. SHOCKLEY has resigned from the superintendency of the W. Y. O. D. mine at Grass Valley to give all his attention to other interests.



THE INTEGRAL QUICKSILVER MINES, CINNABAR DISRTICT.—*See page 323.*

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San Francisco, November 18, 1893.

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AMONG other electric attractions at the approaching Midwinter Fair will be a great tower, elaborately decorated and illuminated by the Western Electric Company of Chicago. The contract with the company calls for the maintenance of this tower during the entire six months of the exposition. They agree to put in a large incandescent electric plant, and also to light the main buildings. The General Electric Company will construct here and run for six months the electric fountain which it had at Chicago. This fountain will occupy a large space in the eastern end of the grand court, opposite to that occupied by the allegorical fountain. This electric fountain is a perfect network of machinery. The colored glass alone which is used in it cost $1200. It has 19 outlets changeable into various forms, the outer circle producing the effect of sheaves of wheat from the sprays of water forming a circle of 14 sheaves around the entire fountain. The largest search light in the world will also be here. The lens, or reflector, is 5 feet in diameter and 15 feet in circumference, and has a capacity of 2,500,000-candle power. It will throw a light so that a paper can be read 10 miles away, and one can make out a ship with a telescope 15 miles off. The General Electric Company will also furnish 400 arc lights.

THE price of aluminum is now 75 cents per pound, and there is a strong probability that it will go down to 50 cents within a year. The Aluminum Industrie-Actien-Gesellschasft, of Switzerland, has increased its dynamo capacity to 4000 H. P., and, having made improvements in the process, will largely increase the production. Dr. Stephen H. Emmens, representative of the Pittsburg Reduction Works, aluminum manufacturers, who is now in this city, is of opinion that no price below 50 cents can be hoped for within a few years, perhaps not in this century. As a matter of fact, the 50-cent quotation is not yet in sight. Prediction that it will be reached is based wholly on the history of the metal in the past, which has declined from a maximum of $90 per pound, in 1856, to its present low figure. Dr. Emmens does not anticipate that aluminum will be as largely employed in the useful arts as some have predicted, though he has no doubt its usefulness will be much increased.

THE State of Nevada is showing a vast deal of interest in the Midwinter Fair and proposes to have adequate representation of all its fine resources. The mineral exhibit at Chicago is to be transferred entire, and, in fact, the whole display is to be brought here, with the addition of considerable new material. Governor Colcord says the people never before showed so much interest in an outside project as in the Midwinter Fair. Curiosities to be shown by the Nevada people include the Carson footprints and Sam Davis.

Proposed Changes in Mining Law.

The Executive Committee of the State Miners Association has accepted the bill framed by the special legislative committee, and it stands as the measure endorsed by the representative body of miners of California. It is settled that it will be introduced and urged in the House by Congressman Newlands, of Nevada. Mr. Newlands has been requested to undertake this service because he is in close touch with the miners of California, as well as his own and other States and Territories, and for the equally important reason that he is a member of the Committee on Mines and Mining. California has no representative on that committee. The text of the bill was printed in full in the MINING AND SCIENTIFIC PRESS of November 11th. It will be interesting to indicate the principal features of the bill which propose to change the present statutes.

In the first place, it is proposed to define in a clearer manner the method of making locations of mining claims, that paragraph in the revised statutes being made to read as follows, the words in italic being inserted in the new bill:

"The location must be distinctly marked on the ground *by posts or monuments*, so that its boundaries can be readily traced."

The following very significant modification as to the period in which assessment work shall be done is made:

"That the period within which the work required to be done annually on mineral claims shall commence at 12 o'clock *meridian* on the first day of January succeeding the date of location of such claim. When the labor required by this act shall have been performed or the improvements made, an affidavit may be filed within thirty days after the time limited for performing such labor or making such improvements with the Recorder of Deeds of the county in which the claim or mine is situated, particularly describing the labor performed and improvements made, and the value thereof, which affidavit shall be prima facie evidence of the facts therein stated. And upon a failure to comply with the conditions of this act in the performance of labor or making of improvements, the claim or mine upon which such failure occurred shall be open to relocation in the same manner as if no location of the same had ever been made."

This paragraph is all new matter.

A succeeding provision is altered to read as follows, the words "a patent" being replaced by the words in italics:

"On all claims located prior to the tenth day of May, eighteen hundred and seventy-two, ten dollars' worth of labor shall be performed or improvements made during each year for each one hundred feet in length along the vein, until *payment of the purchase money and a certificate of entry* has been issued therefor; but where such claims are held in common such expenditure may be made upon any one claim.

This is in accordance with the express recommendation of the State Miners Association. The following new provision is added in cases of notice upon co-owners who fail to contribute their share of expenditure for assessment work:

"*A copy of such notice, together with an affidavit showing personal service or publication, as the case may be, of such notice, when filed and recorded with the Recorder of Deeds of the county in which such mining claim is situated, shall be evidence of the acquisition of title of such co owners.*"

Section 2334 of the Revised Statutes is amended by adding thereto the following:

"*And the surveyors appointed under the provisions of this section shall have power to administer oaths to their assistants.*"

Section 2335 is amended by the following:

"SEC. 2335. All affidavits required to be made under this chapter may be verified before any officer authorized to administer oaths *within the State or Territory where the claims may be situated, having an official seal.*"

The present law requires that such affidavits shall be verified within the land district where the claim is situated. The familiar provision, recommended by the Miners Association, that the presence of rock in place bearing gold, silver, etc., shall be regarded as presumptive evidence that the land is, and always has been, mineral in character, is inserted; together with the provision defining how land shall be determined to be more valuable for mineral than agricultural purposes, and providing that this chapter shall be liberally construed by the land department.

Section 2337, relating to mill sites on non-mineral lands, provides that such lands used or occupied, or *intended to be used or occupied*, may be embraced in an application for a patent, or may be made in a *separate* application for a patent. Locations of such character may reach a maximum of *ten* acres instead of five, as at present.

These are the vital changes in the present laws proposed to be made by the new measure. They include several provisions to be found in the Stewart bill, but of course they omit all that have been pronounced obnoxious to the miners of California. Several provisions which the Stewart bill proposed to omit from the laws are restored by this bill. The full significance of all changes will, of course, not be understood unless taken in connection with the context of the bill.

THE Mayflower Gravel Mining Company has just paid a dividend of ten cents per share.

The Duty on Lead.

It seems certain that the new tariff bill, now being framed by the Ways and Means Committee of the House of Representatives, will contain a provision exempting lead-silver ores from duty. The exact provisions of the bill have not yet been given out, in this or in any other particular, and will not be until the meeting of Congress next month. But the matter is at this time worthy the serious consideration of all miners in the silver States, that they may collect material and argument for presentation to Congress relative to the tariff and its effect upon the industry in this country. Since 1890, under the McKinley law, there has been a duty of 2 cents on pig lead and 1½ cents on lead in lead-silver ore, and it is believed by the great majority of miners that the removal of this duty will add the last straw to the burden the industry is already carrying.

Last year the House of Representatives passed a bill repealing these duties. By its terms it amended paragraph 199, Schedule C of the McKinley law, so as to read as follows:

"Lead ore and lead dross, 1½ cents per pound; provided that all ores carrying silver and lead at the same time, except silver ores containing lead, shall pay a duty of 1½ cents per pound on the lead contained therein, according to the sample assay at the port of entry; and provided further, that ores containing silver and lead, in which the value of the silver contents shall be greater than the value of the lead contents, according to sample assay at the port of entry, shall be considered silver ores and as such shall be exempt from duty."

The above measure passed the House by an overwhelming vote, the division being on party lines. But the Senate was then Republican, and it stood no chance there. The essence of the bill is contained in the last proviso. Of course we do not know that the coming Congress will shape its legislation on these lines, but it is reasonable to suppose that it will. Congress and the President all being committed to tariff reform, it will be seen that a very serious emergency confronts the lead-silver miners.

Previous to 1890, according to the rulings of the Secretary of the Treasury, all silver-lead ores containing a greater proportion of silver were admitted free of duty. As a consequence there was a very strong incentive toward corruption of customs officials to the end that foreign ores seeking importation might be listed as containing more silver than lead. The majority, of course, were really silver ores. Others were not. Corruption did exist and it was freely charged in the debates in Congress on this measure that the United States Government had been swindled out of large sums of money, running into the millions. The Collector of Customs at El Paso, Texas, is said to have been removed from this cause.

J. B. Grant, of the great Omaha and Grant Smelting and Refining Company, declared on affidavit that during 1889 the smelting works had received large quantities of Mexican ore from Mexico which contained more lead than silver, but which came in free of duty.

It was asserted in the majority committee report to the House of Representatives that the measure was in the interest of the silver-miners of the United States, 75 per cent of whom produced "dry" ores, and that the silver-lead ores of Mexico were needed for fluxing ores. But Congressman Sweet of Idaho combated this statement and produced figures showing that only about one-third of the American product is "dry" ore. Besides, it had been declared by experts that a good fluxing ore must contain at least 20 per cent of lead; whereas the average of ore imported from Mexico was but 17 per cent. He said the measure was favored by those smelting companies which owned mines in Mexico and smelters in the United States, and was in the interest of no others.

The minimum at which the lead-silver mines of the Cœur d'Alene district can be operated at a profit is $4 per 100 pounds, considering silver as a by-product. If silver were worth $1 per ounce, of course many of these mines could be operated without so much regard to the value of lead. But when both are down to bedrock it is exceedingly difficult to find a mine whose special advantages are such that it can be run without loss. The cost of labor in Mexico is from one-third to one-sixth the cost in the United States; and it would seem that the miners of this country must have the arbitrary assistance of a tariff duty in order that they may not be driven altogether out of the business by the lower-cost producing mines of Mexico. They are near enough out now. Lead is to-day 3 3 cents per pound, and it is protected in ore by a duty of 1½ cents. What will happen if the duty is removed?

IT is announced that to induce exhibitors at the World's Fair to remove their exhibits to Chili for the mining and metallurgical exhibition, that government promises to pay the cost of transportation for freight and exhibitors and their workmen both ways. It is said every facility will be

afforded them for displaying their exhibits, and the power will be furnished free. There is in Santiago a large building suitable for the purpose, and the government has appropriated $150,000 for expenses. Francisco J. Ranan, representative of Chili in Chicago, has the matter in charge. The opportunity for an exhibit of mining appliances is certainly very great and should not be overlooked by our machinery firms. The exposition will begin in April and continue throughout several succeeding months.

The Integral Quicksilver Mines.

The wealth of the quicksilver mines of California has long been well known. The "New Almaden," "Napa Consolidated," "Sulphur Bank" and others have returned enormous quantities of quicksilver, realizing many millions of dollars and giving large profits to the shareholders. There is no branch of mining in this country that has made such progress in cheapening cost of production. The expensive methods of 20 years since would close every mine now producing, as the per cent of metal being extracted is now so low they could not be made to pay.

Notwithstanding the fact, however, that the methods of treating the cinnabar ores have been greatly improved of late years, the supply, owing to the increased cost of working the old mines, the marked decrease in the value of other ores, and the non-discovery of new deposits of cinnabar of any considerable value, has been constantly decreasing.

The Coast Range of California, bounded by the Idria quicksilver mine on the south and the Integral mines on the north, is the only producing cinnabar belt in the United States where quicksilver has been found in large quantities, and the practical closing down of the Almaden and other of the great producers, and the fact that mines now in operation are gradually lessening their production from year to year gives special importance to the fact that at this critical juncture another Almaden is being developed in the northern part of this State. Reference is made to the very valuable and extensive cinnabar mines owned and operated by the Integral Quicksilver Mining Company in the Cinnabar district, Trinity county, California, and comprising forty-five patented claims of the usual dimensions, besides four sections of timber lands.

The chief promoter of the project for development of this quicksilver district is Prof. Archibald B. McCaw, the well-known mining engineer. Five years since Prof. McCaw's attention was attracted to the district, and he made a personal inspection of the formation and thoroughly tested the character and quality of the ore wherever found. He became convinced of the value and merit of the properties, and he set about to acquire control for the purpose of development. He caused the location of a large number of new claims, purchased the Boston group, and part of the Integral group of mines (already located), and began the work of consolidating the various interests already represented in the district. Prof. McCaw has been steadily and quietly engaged in this work for five years, and the enterprise is now in such shape that its speedy and extensive development is assured. The chief associates of Prof. McCaw in the Integral Quicksilver Mining Company are Mr. Wm. Simpson, a well-known capitalist of New York City; Mr. Wm. J. Simpson, his son, secretary and treasurer, who resides at the mines. Mr. Alexander McCaw has been superintendent and will take an active share in the work of development. Counsel for the company in San Francisco are Reddy, Campbell & Metson, and in New York, Hon. M. R. Lawrence. Prof. McCaw is president. The capital stock is $3,000,000, and the organization was effected under the laws of West Virginia.

Trinity county is in the northern part of California, and has until lately been almost inaccessible compared with mining regions even more remote. The mountains are high, precipitous and rugged; the whole district is heavily timbered and has been much neglected until latterly by the miners of the Pacific coast, although during the past 30 years rich discoveries have from time to time been made there of gold, copper, chromic iron and quicksilver. Communication has now been much improved and the district brought within easy reach of the railway.

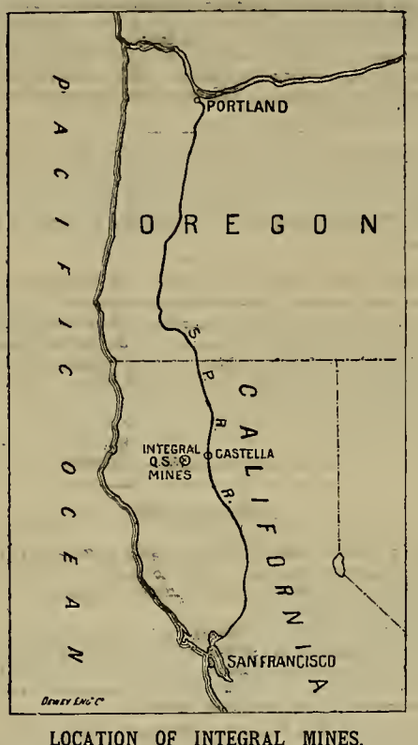
The Integral Quicksilver Mines.—This great property is situated in Sections 14, 15, 21, 22, 23 and 27, Township 38 North, Range 6 West M. D. Meridian at Integral, Cinnabar mining district, Trinity county, California, and is about 12 miles westerly from Castella, a station on the Shasta division of the Oregon & California Railroad, 317 miles north of San Francisco, at which place the Integral Company have a warehouse and other buildings, and at which point supplies are shipped to the mines and quicksilver to the railway by pack animals. All heavy machinery and freight are shipped from Redding, Shasta county, direct to the mines; but this coming year the Integral Company intend building an electric railway from the railroad to the mines, there being ample water-power for driving a heavy electric plant. A postoffice has been established at the mines, and is named Integral. The climate is very fine during the greater part of the year, there being no severe cold.

The average altitude of the mines is about 5000 feet above the sea level. There is plenty of fine timber growth (pine, fir and cedar) all over the surface of the property suitable for building, mining purposes and fuel for quicksilver furnaces.

The property is thoroughly drained to a depth of about 3000 feet near its southern boundary by the east fork of the Trinity river, and near its western boundary by the north fork of the east fork of said Trinity river, so there is an abundant supply of water for all purposes.

The property is known as the Integral quicksilver mines and comprises nearly all the known mineral-bearing territory in the Cinnabar mining district. The length of the property from its northern to its southern boundary is about three miles, and from its easterly to its westerly boundary about three miles, and has a total area of about five square miles, of which about one square mile is mineral and four square miles are timber lands.

Geology.—The geological formations are serpentines, porphyry, limestones, slates, alumina and metamorphic



LOCATION OF INTEGRAL MINES.

rocks. The ore and "gangue" are cinnabar (sulphide of mercury), native quicksilver, calcite, quartz (sometimes carrying gold), magnesite, pearl spar, pyrites and chlorite. The mineral zone is about two and a half miles long by one mile in width, the west country rocks being slates and the east country rock granites. The ore bodies are irregularly distributed throughout the formations, but the major part is in extensive "shoots" or channels in which the ore occurs in "chimneys" of every shape and size, and dipping at all angles.

These "chimneys" are usually connected by stringers or veinlets carrying cinnabar, but the ore is found in all forms and places in the mineralized zones. In the southern and central parts of the property the trend or strike of the ore channels is about southwesterly and northeasterly, and near the northern end the trend follows the swing of the mountain and course of the serpentines, "striking" to the southwest, thence westerly, and thence crossing to the southeast.

The principal mining claims are the Integral Consolidated mines, situated near the southerly end, and the Boston Consolidated group of mines at the northerly end of the mineral belt. The titles are U. S. patents. The present development work is confined principally to the Boston group of mines.

On the Boston mine two crosscut tunnels have been driven through the ore body, showing in lower level an ore body more than 100 feet thick between walls.

A complete plant, consisting of hoisting works, large boiler, engine and Cameron sinking pump with capacity to sink a thousand feet in depth, has been placed on the Boston mine, and development work is being rapidly proceeded with. Levels will be opened 100 feet apart as the shaft is being sunk. Preparations are also being made to develop the Integral group of mines; also ore bodies in many other mines in the central part of the property.

It is estimated that it will be necessary to construct not less than eight furnaces to handle the immense bodies of ore being exposed by developments.

A Knox & Osborn fine-ore furnace with 20 tons daily capacity has been constructed as a test plant, but has only been in operation for a short time this summer owing to defects in construction of condensers.

The company have had to reconstruct the furnace at quite an expense, and have built additional condensers of concrete and cement, and have lined the brick condensers with cement, and the plant, for the capacity, is considered to be one of the most complete in the State. In spite of defects in the plant, several thousand dollars' worth of quicksilver have been shipped to Messrs. Miller, Sloss & Scott, the company's agents in San Francisco.

Several coarse-ore furnaces will be erected this coming year, most of the material being already on the ground, and it is anticipated that this great property will become one of the greatest factors in the quicksilver market in the United States, if not in the world.

There is also a good sawmill, completely equipped, with a cutting capacity of from 12,000 to 15,000 feet per day, and about 1,000,000 feet of lumber have been cut and used in the various buildings, tramways and mine timbers.

There is a good store, supplied with goods requisite for a mining camp; also stables, a large boarding-house and buildings for furnace men and miners. In fact, quite a mining town has sprung up at the Boston Consolidated end of the property.

On the Integral Consolidated section some buildings have been erected in the Blockade mining claim, and a tunnel is being driven on the Integral mine.

This district is the only one in the Coast Range now showing large surface deposits which has not been extensively and at times profitably worked; consequently the field here is now the best virgin field, so far as known, in the State.

With the improved quicksilver furnaces now in use, cinnabar ore running as low as one-half of one per cent can be worked at a good profit where the ores are near the surface and easily handled, as in the case of the Boston mine.

The total product of all the quicksilver mines in California for the year 1877 was 79,396 flasks, but has declined to about 28,000 for this year, 1893.

A Boom in Comstocks.

During the past week there has been a degree of speculation in Comstock shares that has not been rivalled since the balmy days of '86. Transactions have been on an extensive scale—frequently exceeding 100,000 shares per day—and the sessions of the two exchanges have been largely attended by excited speculators; and brokers, who a month since were staggering on the brink of bankruptcy, have been worked day and night to supply the demands of buyers and sellers. It has been noticed that the speculators have mostly been persons of small means, and that large operators have been conspicuous by their absence.

It is difficult to give a substantial reason for the sudden activity in Comstock affairs. No new ore bodies have been discovered. No satisfactory assurance of change in methods of mine management has been given. There has been no reduction in transportation charges. The milling ring is not broken and their methods have not been changed. The cost of labor has not been reduced. The price of silver has not risen. In short, there is at present nothing tangible to restore confidence in the Comstock, or to give assurance that the stream of assessments will not be continued as in the past.

The causes of the "boom" seem to lie in the promise of James Rule to find a rich body of ore in the 1100-foot level of Consolidated California & Virginia; in the skillful manipulations of a jobbing ring; and in the general impression of the stock-gambling public that when matters can get no worse they must get better. The latter is, perhaps, a mere manifestation of the speculative spirit that frequently breaks out in the most unexpected guises. Operations have been chiefly in Consolidated California & Virginia stocks, which last Friday reached a maximum of $5.75, having advanced from a minimum of 90 cents in a month or more, the greater part of the advance occurring in about ten days. Other stocks, by sympathy, shared in the general advance and reached higher figures than for many months. There was no particular in which the assets of the companies were increased, or were about to be increased, so far as known, but the stocks went up just by sheer force of the "boom." The gamble was in Comstocks, and all the mining companies received a share of attention.

The excitement culminated last Friday. Saturday there was a break and the down-hill movement began. The stocks had got up just about far enough to fall hard. The retrograde movement has not, however, been steady, but has experienced sporadic fluctuations which have sent prices up toward the vicinity of the maximum figures.

Consolidated California & Virginia was driven down to $4 yesterday, and other stocks were similarly affected.

It is not at all likely that the "boom" can last. The end must come soon, if it is not already in sight, and the unsophisticated speculators will simply have their experience for their money.

The Olympia's Feat.

The cruiser Olympia, at her builders' trial trip last week, attained a maximum speed of 21.26 knots, and developed 15,000-horse power—a performance that places her at the very top of cruisers in the United States Navy and reflects the highest credit upon her builders, the Union Iron Works of this city. It has been again proved that cruisers of the finest type, answering in speed and equipment every requirement of modern naval warfare, can be constructed on the Pacific coast. Her trial occurred Thursday of last week in Santa Barbara channel. The story of her accomplishment is best told in the words of Captain Charles Miner Goodall, who was in command:

"We turned at Point Concepcion and made the specified course of 43 miles. Reaching the end of the course, we turned round and ran back to westward. She had been increasing her speed all the time until she reached her maximum of 15,000-horse power, which sent her through the water at a speed of 21¼ knots an hour. This was on the course before we struck heavy winds.

"The average on the western run was 20.54 knots an hour. For about one-half the distance we were in a heavy head sea, facing a 30-mile wind, which, added to the speed we were going, made a wind force of fully 50 knots an hour.

"I never saw anything like her in my life for sea work. She is the easiest ship I was ever aboard of. When she is running with the swell on her quarter her roll is slow and easy, and when the sea is in any other direction she is as quiet and steady as a platform on shore."

"What speed ought the Olympia to make in calm weather?" asked the reporter.

"Certainly better than 21¼ knots. At least a quarter of a knot faster; perhaps better than that. On this trip, in addition to the head sea, she labored under the disadvantage of some foulness. She has not been on the drydock for two months; there is nothing on her bottom but tallow, and quite a crop of grass and barnacles has attached itself. This probably held her back half a knot. Besides, she burned a great deal of fine coal. Most of the lump coal was reserved. There is no doubt in my mind that she will easily maintain the speed she made Thursday on the official trial trip, and my judgment is that she will increase it something over half a knot. Her engines worked with absolute perfection. There was not a single hitch, nor the least trouble of any kind.

"I think she is not only the fastest vessel in the United States navy, but the handsomest man-of-war in the world. Her lines are ideally beautiful, and her construction the very best. Besides, she is roomy and comfortable for all on board. The admiral and skipper who get the Olympia ought to be proud of her."

Records made by cruisers in other navies are as follows:

Cruiser—	Knots.
Nueve de Julio (Argentine)	22.7
Blake (England)	22.0
New York (United States)	21.0
Kaiserin Augusta (Germany)	20.7
Reina Regente (Spain)	20.6
Australia (England)	18.8
Jean Bart (France)	18.6

The cruiser Columbia, which had her trial last week on the Atlantic, is said to have made 22.87 knots under forced draught. The indicated horse power of the Columbia's engines is 20,000 at a sustained speed of 21 knots an hour, or 23,000 at the maximum.

SENATOR PERKINS, who has returned from Washington, says it is designed to devote the $12,000 per annum realized for California from the sale of lands to the maintenance of the School of Mineralogy at the State University, if the bill for that purpose passes. It has already passed the Senate, but of course at the regular session it will be necessary to pass both houses again, before it can become a law. The sponsor of the bill in the Senate is Senator Dubois of Idaho; in the House, Representative Wilson of Washington.

MELVILLE ATTWOOD gives his test for small specks of gold in quartz or rocks as follows: The precipitation of mercury upon gold from a solution of mercuric cyanide is a very delicate and easy test for gold in rocks, even when in the form of specks so minute as to be only visible by the aid of a powerful lens. The yellow color (by the use of the blowpipe) persistent at a red heat of the speck to be tested, and the instantaneous whiting of it occasioned by the cyanide, may be taken conjointly as proving it is gold.

THE Church Gold Mining Company, of El Dorado, has paid in all four dividends—two of ten cents and two of five cents.

Assessment Work for 1893.

The bill for the suspension of assessment work on unpatented mineral claims for 1893 has passed Congress, been signed by the President, and is now law. There was such a heavy demand for last week's issue of this paper containing the text of the law that the edition was exhausted. The full text is therefore reprinted:

An Act to amend section numbered twenty-three hundred and twenty-four of the Revised Statutes of the United States, relating to mining claims.

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled, That the provisions of section numbered twenty-three hundred and twenty-four of the Revised Statutes of the United States, which require that on each claim located after the tenth day of May, eighteen hundred and seventy-two, and until patent has been issued therefor, not less than one hundred dollars' worth of labor shall be performed or improvements made during each year, be suspended for the year eighteen hundred and ninety-three so that no claim which has been regularly located and recorded as required by the local laws and mining regulations shall be subject to forfeiture for non-performance of the annual assessment for the year eighteen hundred and ninety-three: *Provided,* That the claimant or claimants of any mining location, in order to secure the benefits of this act, shall cause to be recorded in the office where the location notice or certificate is filed on or before December thirty-first, eighteen hundred and ninety-three, a notice that he or they, in good faith intend to hold and work said claim: *Provided, however,* that the provisions of this act shall not apply to the State of South Dakota. This act shall take effect from and after its passage.

THE new law suspending assessment work for 1893 requires that all persons who desire to secure its benefits shall file notice with the Recorder before December 31, 1893. The following form will doubtless be found as good as any:

NOTICE.

Notice is hereby given that the undersigned, owner of the —— mining claim, situated in —— mining district, —— county, State of ——, being desirous of taking the benefit of the act of Congress, entitled "An Act to Amend Section 2324 of the Revised Statutes of the United States, Relating to Mining Claims," approved November —, 1893, hereby declare that —, in good faith, intend to hold and work said claim.

Witness our hands this — day of ——, A. D. 1893.

[Signature.] ——

The law does not require an affidavit in filing this notice.

Foundry Notes.

THE Union Iron Works has petitioned the Ways and Means Committee to take the tax off coal so they can import from Australia, thereby better enabling them to compete with the ship-builders of the world.

Two 3½-foot Huntington mills have just been shipped by the Fulton Engineering and Ship-Building Works, one to Chamberlain & Price, Torres, Sonora, Mexico, the second to E. G. Starber, Silverton, Colo. It is proposed by the Mexican people to use the mill for working gold tailings.

THE Buckeye Bell Foundry, of Cincinnati, Ohio, has offered a chime of bells for the Midwinter Exposition, which will be erected in a tower of one of the buildings. The chime will consist of ten bells. The weight of the chime will be about 10,000 pounds and it will be patterned after the chime exhibited at the Chicago Exposition.

EIGHT additional armor plates for the monitor Monadnock have been received at the navy yard at Mare Island. The plates are designed for the sides of the monitor and their aggregate weight is invoiced at 63 tons. These plates were hoisted from the schooners by means of steam shears and deposited on flat cars for transporting along the drydock, where they will be fitted and seoured in position.

THE castings for the Firth (Ferris) wheel for the Midwinter Fair are being made at the Fulton Engineering and Ship-Building Works. They include flanges, arms, hub, etc. The arms will be 50 feet in length, and will weigh altogether about 16 tons; the flanges 3 tons. The wheel will be about 120 feet in diameter, and will no doubt be one of the very attractive features of the Midwinter Fair.

THE steamer Bawnmore, which several months since was badly hammered on the rocks up coast, has just come out of the dry-dock of the Folton Engineering and Ship-Building Works, practically a new vessel. Amongst other things done was the repair of the badly damaged stern-post, which was altogether one of the most difficult jobs and probably the largest of the kind ever undertaken on the coast. The post is 37 feet long, 10x8 inches in width, and had to be welded in ten places, straightened and refitted to the stern-frame. Much the same thing had to be done to the rudder-post, 30 feet long, 6x8 inches thick. About 60 plates were cut from the bottom of the vessel and either straightened and refitted, or replaced by new. The work of repair is now practically done.

THE Fulton Engineering and Ship-Building Works have under way the construction of a fine side-wheel ferry boat for the North Pacific Coast Railway Company, for use on San Francisco bay. Her dimensions will be 255 feet length, 38½ feet actual hull beam, 60 feet over guards, and 17 feet depth of hold. She will draw 5½ feet. Her engines will have 56 inch cylinder, 144-inch stroke; boiler pressure, 60 pounds; horse-power, 1300; wheel diameter, 28 feet. There will be two fire-box boilers and two steam chimneys. Her speed will be 17 miles per hour. There will be the usual walking beam. One peculiarity will be the use of a surface condenser, instead of a jet condenser, the latter of which are used by all ferry boats on the bay. The boat is to be finished by next June.

Sliokens.

THE Shasta County Miners' Association has decided to investigate the Farwell process of treating refractory ores.

NEW ore discoveries are reported daily in the Black Hills by the prospectors who are arriving in Deadwood after completing their annual assessment work.

FREDEARCK MUIR, president of the Harqua-Hala and De Lamar Mining Companies, is on a visit to the mines, the former located in Arizona, the latter in Idaho.

THERA is hope that the Seven Devils copper mines, near Baker City, Or., will be worked the coming season on a large scale. An effort is now being made to secure transportation facilities.

THE Murray Creek Mining Company has incorporated in Oakland, with a capital of $80,000. The directors for the first year are Joseph Huber, Herman Harfst, William Miller, Diedrich Husing and Heinrich Gloy.

THE Grass Valley *Union* severely criticises the Osborne Hill mine because the employes, married men and single, have been requested, virtually commanded, to board at the company's new headquarters, near the site of the mine.

THE proposition to send Idaho's mineral exhibit, now at Chicago, to San Francisco for the Midwinter Fair is being agitated in Idaho. It is favored by many of the leading citizens, including some of the State officials, and will probably be done.

THERE are many Colorado mining men in California now, and if the depression in silver continues there will be more. Notwithstanding the fact that there are good gold fields in Colorado their extent is limited, while in California opportunities are limitless.

A MINER in the Pennsylvania mine, near Grass Valley, was descending a shaft when he heard the car coming. He knew that his only hope was to brace himself for the shock and seek to throw the car from the track. He was successful, but sustained very serious injories.

THE Elsinore Coal and Clay Company has been incorporated. Principal place of business, Riverside. Capital stock, $100,000, with Margaret C. Graham and Jane E. Collier of South Pasadena, James Hill and Geo. C. Hill of Los Angeles, and Wm. Collier of Riverside, as directors.

THE Pilot Peak Mining Company has organized with M. E. Sanhorn, of Yuba City, as president, J. N. Turner as vice-president, and E. W. Abbey, as secretary. The company has acquired possession of the Pilot Peak mine. P. T. Turner will be superintendent. Much of the stock of the mine is owned at Yuba City.

THE Morning Star mine at Iowa Hill has declared another dividend of $1 per share. The mine looks exceptionally well, and a large number of dividends are still in store, says the Colfax *Sentinel*. Of late the company has made considerable improvements, but this has not hindered them any in paying regular dividends.

MOONY BROS. of Gold Run have sold their mine, the Gold Ring, to the Gold Ring Mining Company of Oakland for $12,000. The sale was negotiated by Bert Moody and James Gayety. The Colfax *Sentinel* says the price paid is a very reasonable one, and the investors will find they have a good property. The Gold Ring is a good gravel mine, and $15,000 has already been taken out by the former owners.

ARTICLES OF INCORPORATION of the Gold Ring Mining Company have been filed with the Alameda County Clerk. The capital stock is $500,000, divided into 100,000 shares of the par value of $5 each. The subscribers are E. Alberto Moody, $480,000; Thomas F. Graher, $5000; James M. Gavetty, $5000; Almon Ames, $5000, and Charles S. Moody, $5000. These gentlemen are also the directors of the corporation.

HEREAFTER every person applying for land under the homestead laws, who is a naturalized citizen of the United States, or who has declared his intention to become a citizen, will be required to file with his application a duly certified copy of his certificate of naturalization or of his declaration of intention, as the case may be. These are the instructions of the honorable commissioner of the General Land Office, and they will be strictly observed.

PRESIDENT WARNER of the Bimetallic League has issued a call throughout the country to members of the league, saying the exigencies created by the unconditional repeal of the Silver Purchase law renders it important that a conference of active bimetallists be held at an early date to consider the changed situation and determine upon a future course of action; therefore, a conference is called to meet at the headquarters of the league in Washington on December 15th.

ARTICLES OF INCORPORATION of El Encino Consolidated Blue Gravel Mining Company have been filed with the County Clerk of Alameda. The corporation will engage in a general mining business. The capital stock is $100,000, divided into 100,000 shares of the par value of $1 each. The shareholders are: William McDonald, $5600; E. C. Rigney, $1820; A. M. Benham, $14,820; W. R. Thomas, $14,850; J. W. Benham, $2000; F. Chappellet, $4200; J. S. White, $20,000. The directors for the first year are Chappellet, White, Benham, McDonald and Rigney.

AN old Colorado miner will show at the Midwinter Fair a miniature model which he has had on exhibition at the World's Fair of a mine in full operation. He has reproduced in miniature the workings of the Saratoga gold mine of Gilpin county, Colorado, in which he worked for a number of years. With a labor and patience and a skill that only an experienced miner could exercise, his exhibit shows the exact workings of this mine, even to its smallest details, with wonderful exactness. The entire working, both of the surface and underground, are presented in one view and can be comprehended and fully learned in a short study. During this summer hundreds of mining men and mineralogists, professors and teachers from this country and Europe, have looked at it, examined it thoroughly, and the universal expression of opinion has been one of merited praise for its completeness, exactness and simplicity. Such has been the success of this model that it will go to the Midwinter Fair in California, for which a concession has already been granted, and where it will be fully appreciated. In May it goes across to Antwerp to the great international exhibition to be held there.

South African Gold and Diamond Mines.

Mr. Hepburn Prentice, mining expert, who has just arrived in San Francisco to remain during the winter, has, during the past three or more years, devoted himself exclusively to personal inspection of the leading mining fields of the world, and has in consequence acquired a fund of information that is valuable, voluminous and interesting. Mr. Prentice is an Australian, and has a thorough acquaintance with the mining regions of that country. In 1891 he made a visit to South Africa, where he spent some time in the gold fields and diamond fields. Thence he went to England; thence to South America, in British Guiana and Colombia; thence to England, and thence to the United States, where he has spent a year or more. He has just returned from a two-months trip to the mines of British Columbia, and will now devote some time to California. Mr. Prentice told many interesting things the other day to a representative of the MINING AND SCIENTIFIC PRESS about his experiences in and impressions of some of the various mining fields he has visited.

"I was in Johannesburg in 1891," said Mr. Prentice, "when there was a great deal of activity. The Transvaal was beginning to make a deal of noise in the mining world. All the residents were very enthusiastic about the future of the country, and were of opinion that the reefs were inexhanstible. The average dip of the reefs is about 45 degrees, and it was confidently declared that, after reaching a certain depth, they assnme a horizontal position and that they could be worked for miles by drifting. This is, to my notion, all supposition. The ledges are a conglomerate composed of water-worn pebbles, cemented together by a little clay matter and oxide of iron. The gold is found fine, crystalline and angular, never in the qnartz, but in the material inclosing the pebbles. It was at first thought that the reefs were an ordinary placer formation, but that theory has been exploded, and it is evident that the gold was simply leached out from the conntry rock and been deposited in the conglomerate by the usual agencies. Near the surface the conglomerate breaks up easily; hut, as one descends, it is more refractory—pyrites begin to appear and pebbles to disappear, and it becomes one solid quartz mass. It has of course been rendered thus compact hy the enormous pressure. The ledges vary in width from a few inches to eight or ten feet, and as many as three are often found close together.

"The principal district is, of conrse, Johannesburg. When I was there shafts were down 300 feet, hut they have gone much farther since. I regard these fields as the best in the world; hut I do not agree with the conviction so universal in Johannesburg and elsewhere, that they are limitless. My opinion is, that the limit of production will be reached in a few years. The first crushings of gold on the Rand realized 3½ ounces per ton; now the average is from 9 to 11 dwts. The value of the ore has steadily fallen off with increasing depth of the mines. The increasing expense and difficulty of mining, and the greater refractoriness of the conglomerate, will be very important factors in determining the future output.

"There are other fields besides the Rand, though of less importance and extent. In the Barberton, for instance, are found true quartz ledges which are rich in patches.

"The cyanide (MacArthur-Forrest) process was just being installed when I was in the Transvaal. Its great value, hoth there and elsewhere, has been fully demonstrated.

"The climate, the government, the people, the cost and and the manner of living, in the Transvaal, have been fully described by others, and their various characteristics are sufficiently weil known. It may not be amiss to say, however, that the climate is one of extremes—warm in summer and cold in winter. There is little or no snow at Johanneshurg. The organizations of the several South African States are various; hut the dominant interest is English. There are many Americans, particularly mine managers. I expect that some day the Transvaal, the Free State, Mashonaland, and prohahly Cape Colony, will all be federated under one government; that seems to me to he the destiny of South Africa.

The Diamond Fields.—"The Kimberly mining fields were of special Interest to me, as well as to all others who visit them. Kimherly is about 600 miles north of Cape Town, in the heart of South Africa. Johannesburg is 300 miles farther on, in the same direction. The trip from Cape Town to Kimberley is hy rail and, since I was there, Johanneshurg has rail connection with Kimherly. Sonth African diamonds were first found in the alluvial gravel along the Vaal river, hut afterward in the loose limey soil of the upland. They are generally mined in open cuts of great extent and of a depth of from 300 to 500 feet. The first claims were all 30 Dutch feet square (31 English feet); hut these were afterward hought up and consolidated by large proprietors. The Kimherly mine, for Instance, contains 1300 of these claims. As stated, the soil is loose on the surface, hut it passes graduallywith depth to a solid rock, called the 'diamond blue.' The formation is shale and diorite, with horizontal bedding. The shale is fossiliferous, carrying carbonaceons matter, which by chemical action is transformed into diamonds. Open mining has been the method generally employed. Hoisting works are located at the surface, on the embankment, and the gravel elevated from the pit in buckets by ropeways. But it has become necessary to change the system. With increasing depth the banks began to cave in, and progress became difficult and expensive. So now shafts are sunk from the surface and the 'diamond blue' reached by driftiog. It is mined and hoisted by the ordinary methods. At the surface the gravel is transported in cars to the 'weathering' fields, where it is left exposed to the decomposing action of the elements for about three months. At the DeBeers mine there were 500,000 loads of rock in one dnmp. After weathering, the process of extracting the diamoods begins. The gravel is placed in large revolving pans. It is there so acted upon by water and by 'stirrers' that the heavy gravel containing the diamonds sinks, while the lighter matter passes off at the surface. The gravel is then taken out and passed through sizing screens, all stones over about three-fourths of an inch being cast aside. The gravel thns cleaned is then sent to the sorting sheds. Here the process of 'jigging' begins. It consists of jigging the gravel in an ordinary pan, perforated with small holes in the bottom. The gravel becomes very compact, the diamonds having meantime sunk to the bottom of the pan being of greater specific gravity. The contents of the pan are then turned out on a table by a quick reversing motion. Some of the diamonds, if there are any, will then appear at the top; hut the gravel is carefully examined by means of a 'flip,' which is used by dextrous manipulators to spread the gravel out very thin, so that it may be further examined for the precious stones.

"The method of guarding the laborers, who are negroes, is very thorough and exacting. Their labor is performed in a large 'compound,' which is simply an area enclosed by a high iron fence, carefully guarded. It contains the work huildings and dwellings. The labor is hy contract. No negro is allowed to leave the compound under any pretext for three months. When he comes out he must strip naked. His clothing is carefully searched. Then his eyes, hair, ears, mouth and all other possible places of concealment are systematically examined. Afterward he is manacled and shackled, and kept in confinement for two weeks, being thoroughly physicked to discover if he has swallowed a diamond. Notwithstanding these extraordinary precautions, the loss of diamonds hy theft is great, and a class of buyers known as the I. D. B's. (Illicit Diamond Buyers) manages to thrive. Laws against the illegitimate traffic are very strict. All mines are licensed, and the discovery of all diamonds is recorded. If an uncut dlamond is found upon a person, it is *prima facie* evidence that he is engaged in Illicit pursuits, and he is severely punished. When I was in Kimberley nine I. D. B's. were captured and punished. Most of the I. D. B's. are Jews.

"There are five great diamond mines around Kimherly, principal of which are the Kimberly, De Beers, and Yagersfontein, the latter a new one and said to be the richest of all.

British Guiana Placers.—"Last year I was in British Guiana, between Venezuela and Dutch Guiana, South America. The placers are located from 100 to 150 miles inland, and are reached by river. The country is tropical and covered with heavy jungle. The placers are shallow, and are worked hy sluicing. The area of the placer country is about 100 to 150 miles hy 50. The fields vary in value, but on the whole they are worth working. The ontput in 1891 was 100,000 ounces, which was increased in 1892, and will no douht he still larger in 1893. The ownership of the fields is both foreign and native. The properties are mostly small. A few diamonds are also found in the fields, but they are rather low in quality and meager in quantity. The inhahitants hope, however, to strike a rich deposit.

"I was also in the United States of Colombia, but I had the fever, and I left without examining the mines."

Mr. Prentice's impressions of some of the British Columhia mining regions will he given next week.

The Value of Copper.

A contributor to the Prescott *Journal-Miner*, giving the reasons of the decline in the value of copper, says:

Copper was formerly largely used in bottoming ships. The use of hreech-loaders and shells during our civil war and the French and Prussian war gave an increased demand for copper which, notwithstanding the increased supply, forced prices higher than had been known during the century. In 1873, when copper sold in the United States at 30 to 31 cents currency, we imported copper, the duty on which was three cents per pound, levied to help Zack Chandler and his associate owners of the Calumet & Hecla mine, on Lake Superior, make dividends of $2,500,000 per year, and gold was at a premium of 20 per cent ahove greenbacks. The gold value of copper in Europe was 21 to 22 cents per pouod. The mines of Arizona and Montana were not opened. Steel and iron began to be used in bottoming vessels about the year 1876, and in eight years had displaced copper altogether, which caused lake copper to fall from 20 cents in 1880 to 10 cents in 1884, where it is to-day, and the United States, with development of the copper mines of the West, became exporters instead of importers of the metal. The extraordinary productiveness of new American mines, and improved methods of mining, smelting and milling, with the cheapening of transportation, has more than doubled the American production in ten years. Six years ago a French syndicate was formed to control the price of copper, millions of francs were sunk in the enterprise, and after a year the syndicate collapsed. Efforts have been made to limit the supply and advance prices, but the schemes have not been successful. It is true that the introduction of copper in all electrical contrivances has opened a new market for copper and copper wires, which is increasing annually with the extension of the use of electricity, and the price may advance several points above where it is now; but it will take a big European war of several years duration to place the price of copper at 20 cents per pound, or anywhere near it.

In referring to the decline in copper, Mr. David A. Wells says: "Copper tea kettles which sold in 1860 for $2.50 can now be bought for 75 cents, and this homely example illustrates the great decline which has taken place in the price of copper since 1860, *i. e.*, from 26 cents to 9 to 10 cents per pound, which the commercial world is agreed has been wholly due to the extraordinary productiveness of new American mines and new methods of mining and smelting, and which decline one of the most influential syndicates ever organized, with command of enormous capital, was utterly unable to prevent."

Mexico and the Silver Question.

Mr. Lionel Carden, English Consul at Mexico, in a recent exhaustive report, discusses the effect on Mexico of a further serious depression in the price of silver. He sums up his conclusions on the hypothesis that the present value of the dollar, which was 70 cents at the time of writing, falls to 60 cents. This would, he says, have the following consequences for the country:

1. The Government would suffer a direct loss of $2,016,757 on the payments it has to make abroad. It wonld also suffer an indirect loss on its customs revenue of $3,113,536, provided the purchasing power of the country in dollars did not vary from what it was in the fiscal year 1889-90.

2. As the stocks of merchandise on hand have been considerahly reduced during the past year, it is prohable that the actual loss suffered by the commercial classes would he restricted to very narrow limits, and that prices would soon adapt themselves to the altered conditions of exchange, without prejndice to the amount of sales.

3. The railway companies would unquestionably suffer at first from a rise of 30 per cent in the premium on gold, which would require an increase of 23 per cent in their net earnings in order to make it good. They would, however, find some compensation in the ordinary development of their traffic, which is increasing at the rate of about eight per cent a year, and by the opening of new traffic for export rendered possible hy the improvement in the selling price of certain products.

4. The local mannfacturing industries are practically uninfluenced by a depreciation of silver.

5. The profits of silver miners in Mexico are not affected hy a reduction in the gold value of that metal, as the greater part of the expenses of mining is payahle in silver dollars, while the increase in the cost of supplies imported from abroad is set off by the very general existence of a small proportion of gold in the silver ores. Mexico therefore can continue to produce silver profitably when countries on a gold hasis, such as the United States and Australia, can no longer do so. On the other hand a depreciation of silver would very greatly stimulate the mining of gold, copper, and the haser metals, all of which are found in more or less abundance throughout the country.

6. Finally, the profits to be derived from the cultivation of agricultural products for export would he largely increased hy a depreciation of silver, while those intended for home consumption would not he affected by it one way or another.

"In striking a balance between the advantages and disadvantages arising to different interests in Mexico from a depreciation of silver it must he borne in mind that the losses which would he sustained hy the Government and the railroad companies are essentially limited in their amount, whereas the benefits which would accrue to certain of the productive industrles are susceptible of indefinite extension.

Dssquamation and Decay of Rocks and ths Formation of Bowldsrs.

IN THREE PARTS—PART II.

Written for tbe MINING AND SCIENTIFIC PRESS by Henry G. Hanks, F. G. S. A., F. G. S., ex-State Mineralogist.

The scope of this paper will be the history of stony fragments from the time they are broken from rock masses until they become wholly disintegrated and reduced, not necessarily to their elements but until they become impalpable powder, during a period of time impossible to measure accurately, but in which elements may have interchanged many times. Ovid's poetical idea of the metamorphoses of human beings finds a parallel in inanimate nature. Just when and how the rocky strata of the earth's surface were formed is quite foreign to the purpose of this investigation, nor may we here inqnire by what force fragments were detatched and scattered over the face of the earth. But we may assume that any rock detatched fragment, great or small, hard or soft, will immediately commence to weather to bowlder form. If we doubt we have only to observe the operations of nature in the field. Bowlders in all stages of formation can easily be found. The weak parts of irregular masses of rock are the corners and angles; these first yield to the disintegrating forces, and the separatlon of secondary fragments or scales always leaves the parent bowlder more spherical. This operation goes on rapidly in soft stones, more slowly in hard ones, until they are all finally reduced to sand. While this operation is only finished durlng long periods of time, newly broken fragments are continually starting on the same road. When individuals of one series of bowlders are nearly or quite reduced to sand, others are just beginning to scale off, so that while some bowlders are ever in the last stages of decay, others take their places, the crop never fails, and the surface of the earth is never wlthout the normal supply. Nor do they keep pace with each other on the road to destruction. The nature and physical properties of rocks determine the life of each bowlder and the time when they shall wholly decay. The harder rocks endure for centuries and outlive many crops of softer bowlders which weather, moulder, and wash away, while those of more enduring quartz remain almost unaffected, although they too yield at last. This is why such great collections of quartz bowlders are so frequently observed. Quartz containing pyrites shares the same fate as softer stones, but the decay is less rapid. The elements of decay lurk in the fugitive galena, pyrite-mispickel and other sulphides, which first moulder or part with their elements, leaving dlvided quartz the sooner to disintegrate. Pure white vein quartz, being the most endurlng, is finally left. It ls a common thing to see in our hydraulic mines soft bowlders soon mouldering into heaps.

Bowlders already formed or partly formed have been frequently noticed ready to fall on slight disturbance. By this I mean that, under certaio conditions, rocks generally stratified divide naturally into blocks which desquamate while still in their original beds and form incipient bowlders. Geikie (text-book of geology, folio 397) has figured an example of this character. There are at least two localities in California where this may be seen—one near Sulphur creek, Colusa county, and the other on the grade from Smith's creek to the summit of Mount Hamilton. The former is the most characteristic. There are probably many other instances of this occurrence, but these attracted my particular notice.

The operation of bowlder weathering ls sometimes temporarily suspended, but the inexorable law resumes its work when conditlons change. I have recently noticed an example of this nature. On the stage-road between Blocksburg and Harris, in Humboldt county, may be seen large outcrops of a rugose, rocky formation which a closer examination shows to be conglomerate, called also puddingstone (farcilite of Klrwan) aod in Latin *calculus compositus* and *saxa aggregata*. The surface of the hill is covered with large, rounded bowlders of this conglomerate, from which the ancient bowlders and pebbles are continually falling, and upon which the interrupted weathering is resumed. In the course of time, all will disappear. The ferumloating cement seems to be ferruginous sand.

Interesting examples showing the effect of the temporary suspension of this law may be seen on the bars of Mad river, in Humboldt couoty. There are many rounded bowlders of rather fine-grained conglomerate evidently from the locality above mentiooed. Yielding to the law, they are gradually becoming less in size. That they will eventually become wholly disintegrated, and the elements and minerals they contain be left free to form other combinations and take new part in the economy of nature, cannot be doubted.

At the same locality, specimens illustrating the effect of this law on minerals having different degrees of hardness are abundant. A fine-grained, rather hard sandstone and a many-colored jasper—itself a metamorphic rock—both weathered into bowlders, are met with, intersected by small veins of other minerals generally white. Some of these seams are of quartz and others of calcite—harder in the first instance than the inclosing rock and softer in the latter case. The quartz is now in ridges, while the calcite near the surface has weathered away, leaving channels, and the jasper in the condition known to mineralogists as "hacked quartz."

A similar conglomerate which weathers into rude columns and castellated peaks, that from a distance resemble the works of man, covers a large area in Esmeralda county, Nevada, and it is common in many other parts of the world.

Another example is the pebble-strewed sea beach at Pescadero, San Mateo county. These pebbles are washed from decomposing conglomerates which lie in extensive beds at this locality.

The first nutice of the formation of bowlders by weathering was made on eruptive rocks of the nature of basalts, traps and lavas.

As early as 1776 the following was published: Raspe (An Account of Some German Volcanoes, etc., London, 1776, fol. 63), writing of black and gray lavas in "concentric globular slate-like or indeterminate forms," describes them thus: "Though extremely hard and compact, they are, however, but slowly dissolved or affected by air, since exposed to it for many centuries, they get a white grayish color which now and then is found penetrating for a tenth of an inch into their harder and deeper-colored inner substance."

Faujas de Saint Fond, both in his great work (*Recherches sur les Volcans éteints du Vivarais et du Velay*, Paris, 1778, fol. 154) and in *Mineralogie des Volcans* (Paris, 1784, fol. 40), describes masses of basalt in spherical form. In both works these bowlders are figured, in the former *planche* 1, and in the latter *planches* 2 and 3. These figures and his descriptions show that they were weathered bowlders just such as I have seen in California and Arizona at several localitles.

The most remarkable bowlders described by this author were near Pradelle, in Haut Vivarais, France. They were very numerous. The largest was 45 feet in diameter, and the smallest 4 inches and 3 lines in greatest diameter and 3 lnches in its smaller.

This author was of the opinion that lava bowlders were sometimes formed while in a liquid or semi-fluid state, and in other cases naturally by weathering.

"There is no doubt that bowlders are sometimes formed in this manner, which, nevertheless, have the roundness of those basalt ones of which I speak. The following observations I have made on the position, contexture and accumulations of these bowlders persuade me that the basalt sometimes naturally takes the spherical form." (Fol. 155.)

Rev. James Douglas (A Dissertation on the Antiquity of the Earth, London, 1785, fol. 49.) thus vaguely expresses the same idea: "The pebbles that are found on the seacoast and in many beds of the earth do not receive their form from attrition only, but have been so rounded in their original structure in the beds of matter from which the water or other revolutions nf the earth have at some distant period separated them. They have mostly, like some flints, been originally created in nodular forms. Attrition by water may have injured their surface, but they do not certainly owe their recent form to this latter cause. This inquiry, as it may be seen at first sight, would admit of an elaborate treatise to explain it in a satisfactory manner."

HENRY G. HANKS.

Results from Heavy Blasting.

A very interestlng paper has lately been read before the New Zealand Institution of Civil Eogineers, says an exchange, on the subject of heavy rock blasting—granite, gneiss and limestone—in large blocks. It appears that in some recent operations on an extensive scale for public works, large blasts were employed, the rocks varying from bedded and joined gneiss to homogeneous masses of granite, and on an average one pound of dynamite dislodged ten tons of stone, the total amount of charge being usually decided on this hasis. The separate charges were proportioned in the ratio of the cubes of their least resistance, and this latter was divided by 35 for dynamite; 36 for gelegnite; 43 for gelatine dynamite; 50 for blasting gelatine; and 12 for blasting powder.

It seems that blasts containing three tons of explosives and another of seven tons were each fallures, as they broke up the rock too much. It was found that charges of from one-fourth ton to one and a half tons were the best, but this class of hlasting hardly answers with a line of least resistance exceeding 40 feet. Beyond that the elasticity of the rock along this line becomes too great for the resistance of the back off which the charge works; and, instead of throwlng the front out, the explosion may merely develop an undulating movement radiating from the charge. The best results were obtained where the rock had one or more loose ends with a nearly vertlcal face, a strong toe at the quarry floor level being usually first removed by hand hlasting before firing the last shot. The length of the adit was made as nearly half the length overhead as practicable, while the most even results were obtained if 15 multiplied by the least resistance was adopted for the interval between the chambers, and even less with irregularly shaped blasts.

To Resume on the Gold Bank Tunnsl.

The Nevada City *Transcript* is informed that operations will soon be resumed on what was formerly known as the Gold Bank tunnel, a mining venture of gigantic proportions inaugurated by Francis Burns a few years ago. The name of the present company is the Grass Valley Rallway and Tunnel Company of New York. Another change is to be made in the name and the company is to be reorganized.

If carried out, this will be one of the largest and most important mlning enterprises ever undertaken on the coast. If the original plans are followed the tunnel which Burns started will be driven ahead as previously contemplated. It starts at a point on the South Yuba river, near Hoyt's old crossing, about four mlles west of this clty. In its course the big tunnel will pass close to the principal mines now being operated in this district, and will drain them to a much lower depth than any of the present drain tunnels; in fact, this is one of the objects in running the tunnel, as the royalty to be received from the mining companies for the privileges of draining will of itself be quite a handsome income. The tunnel is to be four or five miles long, and in its course will tap the Spanish, Nevada City, Wyoming, Champion, Merrifield, Mountaineer, Providence, California, Fortuna, Reward, New England, Pittsburg and other mines in thls district, and then be continued to the Grass Valley district, where the Idaho, Maryland and other mines can be drained. Branches are to be run from the main tunnel at different points. One of these branches will drain the Gold Flat section.

The value of this deep drainage is appreciated by all miners and mine-owners, as operating expenses would be greatly reduced. Heavy and costly pumping machinery will not be required in many places where it is now absolutely necessary, and scores of mines could be worked to a great depth without the outlay of capital now needed.

It is firmly believed that many undiscovered quartz ledges will be encountered in driving this tunnel, and that it will also be the means of still further exploring some of the mines that have been worked for years. It is further expected that sufficient pay rock will be taken out to materially aid in the cost of construction, with the great possibility of unearthing one or more very rich mines.

Prof. George Treadwell, who is at present in this city, is to be the superintendent. He expects to resume work at the tunnel before long.

For a School of Minss.

The following bill, introduced by Senator Dubois of Idaho, passed the U. S. Senate under suspension of rules, and there is a good prospect that it will be re-presented at the coming regular session of Congress and become a law. The bill is supported by Senator Perkins of California:

A Bill to Aid the States of California, Oregon, Washington, Montana, Idaho, Nevada, Wyoming, Colorado and South Dakota to Support Schools of Mines.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That each of the States of California, Oregon, Washington, Montana, Idaho, Nevada, Wyoming, Colorado, Minnesota and South Dakota shall annually receive twenty-five per centum of all moneys paid to the United States by each of the said States for mineral lands within the said States, for the maiotenance of a school of mines in each of the said States; *provided*, that said sum so to be paid shall not exceed the sum of twelve thousand dollars per annum to each State, nor shall it exceed the amount annually expended by each of the said States for said school of mines.

SEC. 2. That before any money shall be paid to each of the said States under the provisions of this act the Secretary of the Interior shall certify to the Secretary of the Treasury that each of the said States ls maintaining a school of mines within its borders in which students in attendance are given instruction in chemistry, metallurgy, mineralogy, geology, mining engineering, mathematlcs, mechanlcs and drawing, and that the students in attendance from other States are received into said school of mines on the same terms and conditions that the students from the said State are received.

SEC. 3. That the board of trustees of each of the said school of mines shall make a report each year to the Secretary of the Interior of the number of studeots in attendance at such school of mines, the State of which they are inhabitants, and the general course of studies pursued in said school, and the amount expended ln the support of said school.

Gold Mines of Plumas.

In course of a review of new mining enterprises in Plumas county, the *National Bulletin* says:

Among the new enterprises inaugurated during the season drawing to a close is that of the Quincy Mining & Water Company, a corporation which Chas. R. Thompson of Spanish Ranch was instrumental in organizing. Messrs. O'Brien, White, Ralston and Hall became interested, and during the past several weeks the company has had employed in connection with its property about 70 men, repairing the 40-mile ditch, flumes, tunnels and reservoirs. A restraining dam across Spanish creek is to be constructed, thus enabling the corporation to work the large area of mining ground now under its control. We are confident that next season will find it operating on a large scale, much to the benefit of themselves and the county generally.

Another important enterprise now maturing is that in which Col. Day and Messrs. Lathrop, Lewis, Booth and others, through the efforts of F. E. Thomas, have become interested. Not long since the *National Bulletin* noted the purchase by Col. Day of the Hungarian Hill water ditches and mines, and the intention of the purchaser to conduct the water across Spanish Creek canyon to the Bell mine for power purposes. Since that time, Col. Day and his associates have acquired over 900 acres of placer mining ground covered by the waters now under their control. Several men have been at work repairing ditches and flumes, so that as early as possible in the spring placer mining there will begin on a large scale. That rich returns will be secured, the gold obtained in that vicinity in years past; the amount of virgin gravel deposits owned by the company and its increased facilities for working them, argue it to be a certainty. It is intended that placer mining shall be prosecuted on the ground mentioned while the company next spring lay its pipes across the canyon of Spanish creek and cut a ditch to the Bell mine.

Of very great importance to this community are the arrangements just made by ex-Senator Kellogg for the development and working of the Elizabethtown channel, north of town. He informs us that he has entered into a contract by which capitalists are to take charge of the property, put in the necessary machinery and develop the mine. It is expected that work will begin this fall and that quite a number of men will be employed. Here undoubtedly is one of the best drift gravel propositions in this part of the county. The thousands extracted in early days from the placers near old Elizabethtown, and later on by Loring & Leavitt from the "Riverdale," a part of the Elizabethtown channel lying immediately above the Kellogg property, proved conclusively the great wealth that in past ages has been dumped into this canyon. Parts of the channel have been fabulously rich, and there is no reason to doubt that the virgin ground of the Kellogg and of the Loring & Leavitt properties contain equally rich gravel deposits. Properly developed, as we assume it will be, old miners acquainted with the property expect it to become one of the most important enterprises in the county. That its successful operation will be of especial benefit to Quincy can be seen at a glance.

Since writing the above we learn that the Loring & Leavitt mine also has been bonded to, and will be worked by, the same parties who have the Kellogg property.

Still another placer mining enterprise, east of Quincy and near the old Parker place, has matured—the Northern Placer Mining Co., of Pittsburg, of which E. J. Sudden is president. This company, during the past summer, under the superintendency of its organizer, Pitner Trayner, cut several miles of ditch, erected flumes and built a reservoir, and is about ready for operations. The owners are confident that they have a good property. They have ample means to equip the mine properly. Dams to restrain debris and to store gold-bearing cement will be constructed.

The Gruss mine, in Genessee valley, is running steadily, with a good force of men, and the presumption is that the yield of gold is quite satisfactory.

The Centennial quartz mine, in the same locality, recently purchased by a syndicate of Nevada people, is being put in shape for active operations next spring. The mill will be equipped with concentrators, thus improving its gold-saving facilities.

At the Lucky S twelve men are reported to be at work developing the mine and putting machinery in place. That important developments will be made there is confidently believed. The mine has produced some very rich ore.

The important developments in the Pilot Peak mine, near Onion valley, justify the belief that one of the feeders of the rich placers worked in that vicinity in the early days has been found, and that the corporation recently formed will be rewarded for the outlay necessary to make for proper development work. The ore is reported to be extremely rich. The Turner brothers and M. E. Sanborn are among the lucky owners.

The Electric Search Light in Shaft Sinking.

Mr. James Baird, in the course of a paper read before the Mining Institute of Scotland, said that the electric search light has been used to great advantage in shaft sinking at the Walkinshaw colliery, near Palsley, Scotland. The apparatus consists of an arc lamp, a lens and a mirror, the whole inclosed in a sheet-iron case 20 in. by 20 in. by 5 ft., having a sliding shutter on each side to give access to the lamp. The adjustment of the lamp is effected by a screw on the top of the case. As occasion requires it can be adjusted to diffuse light throughout the whole shaft, or be concentrated at the bottom, where the men are working. The mirror is hung on its center, and can be moved in a vertical direction, so as to deflect the rays of the light to where wanted, after which it is held in position by a thumb screw. The illuminating power of this lamp is equal to between 4000 and 5000 candles. The dynamo is an Elwell-Parker continuous current, compound-wound machine, running at a speed of 1340 revolutions per minute, and having an electromotive force of 65 volts, and a current of 20 amperes, which is equal to about 2-horse power.

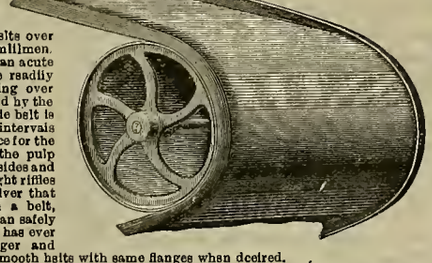
The shaft at Walkinshaw is circular, 13 ft. in diameter, and 260 ft. deep. It is lined with brick all the way, and is free from all buntons, except those necessary for carrying down brattice boards for ventilating purposes. The shaft, therefore, was favorable for this form of light, and so bright and clear did it illuminate the shaft bottom that it had the appearance as if the sun was shining on it. In the case of an oblong shaft with, say, two midwalls, the light would not give the same satisfactory results, but this could be remedied by having two lamps; and in the event of a deeper shaft being required than the one in question, a more powerful lamp could be used, although it is believed that the one employed at Walkinshaw would answer to a depth of 1200 feet.

From experience the following advantages were found with the electric light: 1. The light at the shaft bottom was far in excess of that from the ordinary sinker's lamps, consequently more work could be performed in a given time. 2. The lamp, being stationed on the surface, could be got at easily at any time for adjustment without inconvenience to the sinkers; and in the event of the strata giving off fire-damp, it would give perfect immunity from danger of explosion. By the aid of the light those in charge could see from the surface what was going on below, and this is an important matter.

While the light has great advantages, it is not, however, without its drawbacks, and not the least is its inability to pierce fog and the smoke from shot firing. With good ventilation the latter can very soon be cleared off; when fogs happen, provision would have to be made to use the ordinary hand lamps.

THE outlook in the Kootenay district, B. C., is declared to be encouraging, even if silver is very low. There is considerable activity in silver-mining properties. In one mine—Number One, at Ainsworth—a fine body of ore has just been exposed. It is a dry silver proposition, very high grade. Some of it is said to run 350 ounces, and the carbonates average 100 ounces. From 1000 to 1500 feet of development work has been done and 62 tons of ore have been shipped, the average returns showing 150 ounces in silver to the ton. At Kaslo, in the Slocan district, the outlook is more encouraging than for some time. Two or three months ago the town, after a very active period, was suddenly deserted, owing to the break in silver. Now, however, the town is again filling up, and much ore is arriving down from the mines.

THE BLASDEL CONCENTRATING BELT COMPANY.



We are now having our new Improved Concentrating Belt manufactured in San Francisco. We keep always on hand Belts suitable for the Triumph and Frue machines, but can make any length or width desired. The advantages of these belts over *any others* will be readily seen by practical millmen.

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Mechanical Progress.

Waste Heat Energy Utilized.

Eustace F. Piers, of London, has patented an invention the object of which is to utilize tbe beat energy remaining in the products of combustion after the piston of a gas engine has performed its power stroke. To attain this object a second cylinder, of larger capacity than the power cylinder, is added to the gas engine; and the two cylinders are connected to cranks upon the crank-shaft removed from each otber by about 180°; so that when the power piston is making its outstroke the otber piston is making its instroke, and vice versa. Assume a compressed charge in the power cylioder; this charge is ignited, and the power piston makes an outstroke; at the same time the second piston makes an instroke in its cylinder, compressing air drawn in through a valve by tbe precediog outstroke; as tbis proceeds the pressure in the power cylinder decreases, wbile that in the subsidiary cylinder increases, until the valve controlling the passage between the two opens, and the air rushes into the power cylinder; here it mixes with the bot products of combustion and expands; the return stroke of the power piston forces the mixture of products and hot air into the subsidiary cylinder, where they do work in assisting the outstroke of the suhsidiary piston. The next outstroke of tbe power piston draws in a new charge, while the instroke of the subsidiary pistnn exhausts.

Nine Hnndred and Ninety-Nine.

So much interest has been expressed by the public in the famous locomotive, No. 999, which covered a mile in 32 seconds, that the New York Central has issued the following technical description:

Cylinders	19 inches by 24 inches.
Diameter of driving wheels outside of tires	86 inches.
Diameter of engine truck wheels	40 inches.
Springs, length of driver, center to center of bangers	44 inches.
Total length of boiler	26 feet 4⅛ inches.
Diameter of first ring outside	58 inches.
Size of fire-box	105¾ inches by 40¾ inches.
Tubes, 268	2 inches diameter, 12 feet long.
Heating surface in tubes	1697.45 square feet.
Heating surface in fire-box	232.92 square feet.
Total heating surface	1930.37 square feet.
Grate surface	30.7 square feet.
Stack, inside diameter,	15¼ inches.
Weigbt in working order	124,000 pounds.
Weignt on drivers	85,000 pounds.
Driving-wheel bsse	8 feet 6 inches.
Weight of tender, loaded	80,000 pounds.
Total weigbt of engine and tender	204,000 pounds.
Extreme length of engine	89 feet 6¾ inches.
Extreme hight from top of rails to top of stack	14 feet 10 inches.

Fuel used, bituminous coal.

Sustaining Power of Ball Bearings.

At the discussion on the loads permissible on ball and roller bearings, at a recent meeting of the Engineers' Club of Philadelphia, Wilfred Lewis stated that a manufacturer informed him that almost nothing was known on the suhject. Some crude experiments with three-eighths inch balls showed them to have an ultimate strength of 2000 pounds, and a safe working limit of 400 pounds; though when used in car journals, in which tbe motion was continuous and rapid, it was better not to exceed 200 pounds. Wbether a tbree-fourths-inch ball would carry twice or four times as much as a three-eighths-inch ball was not known, but there was an impression that over a given extent of surface more load could be carried on small balls than on large ones. The effect of hardening was believed to increase tenfold the carrying capacity of a ball bearing.

Early Wire Drawing.

In a paper read at the British Iron and Steel Institute meeting, Mr. J. P. Bedson stated that the wire-drawing trade was started in England by four families who went there from Germany, and they first hammered (called "tilting") the charcoal iron into ¼-inch square rods, which afterward they drew through draw-plates, but not on tn blocks. This was effected by means of a long pole, which had a reciprocatlng motion, actuated by a water wheel, and in this way worked backward and forward. In the forward stroke it drew the rod and wire through the plate and on its return stroke, both of which were very slow, the workman sat and coiled up the length drawn by hand into a ring, and thus continued until tbe whole piece was drawn. The annealing was done in a kiln or brick oven, where the wire was heated to redness and allowed to cool naturally. This formed a lot of scale, which had to be removed by hammering, and then scoured in a barrel filled with wire and gravel and caused to rotate by water power, half immersed in water, for about 12 hours, when the wire was taken out, coated with flour lees, and ready for drawing on.

For Cooling Condensed Water.

A new arrangement for cooling condensed water has been invented in England. After the water has passed in the ordinary way from the condenser to a receiving tank, it is carried through a series of specially arranged coils, which are exposed to the atmosphere, and in its passage undergoes a process of purification and cooling until it ultimately falls into another receptacle called tbe "reserve tank," in an absolutely renewed condition. This water, which, it may be observed, had already been used in the boiler, is then again available for feed and condensation. It will be seen that by this arrangement, owners of wolks will obtain perfect security against the necessity of discontinuing operations through any temporary failure of the water supply, as a given quantity of water may be used any number of times, requiring only such replenishment as will make up for the small losses resulting from leakage and the elimination of impurities. This is what the inventor describes as the "dry process," as distinguished from the "wet process," for cooling condensed water. The inventor claims that if the "Proell cut-off gear" is used for the engine in connection with this system, the saving of fuel will be fully 35 per cent, while the water required for steam-producing purposes will, after the acquisition of the first supply, be an inappreciable quantity.

Blacking for Sheet Iron.

The simplest metbod to blacken iron, says an exchange, is to heat with oil, especially linseed oil. The objects are first rubbed or painted with oil and then heated to such an extent that the oil is burned off. The surface produced in tbis manner is coal black and gives the objects a black coloring which will withstand the highest temperature. After the application is thoroughly dried the objects can he rubbed with benzine or a solution of soda.

In order to procure a black asphalt lac for iron, melt eight pounds of asphalt in an iron kettle, gradually adding 12 pints of cooked linseed oil, one pound of litharge and a half pound of sulpbate of zinc. The whole mixture should be allowed to boil for three hours. Finally, one and one-half pounds of black amber is to be added and the mixture carefully boiled for two hours longer. It is advisable, previous to using this mixture, to thin it somewhat by the addition of oil of turpentine.

Mattresses for River-Bed Protection.

One of the most interesting novelties in the construction of the great Memphis bridge across the Mississippi, at Cairo, was the use of mattresses to protect the river bed from scour under the pier sites. These mattresses were woven from willow witbes and wire. They were 400 feet long by 240 feet wide, and were sunk by loading them with stone. Wben in place they completely protected the river bottom from scour, and enabled the pier caissons to be handled and sunk without difficulty. Each nf the mattresses contained 1000 cords of brush and poles, 900 tons of stone, and 10,000 pounds of wire.

To Prevent Rear-End Collisions.

A device to prevent railroad collisions is described by the Chicago *Journal of Commerce*. The invention requires a small electric-lighting system at dangerons curves. By a piece of mechanism placed at a certain point beside the tracks, the wheels of the train in striking it would pump air into a reservoir cylinder. The air would be forced through a tube to an electric arrangement and force hack a float resting on mercury in a circular tube. The displacement of the float would allow an electric-lighting circuit to be established and electric lights of the incandescent pattern would flare up within a certain distance before and behind the train. The lights would remain burning for a length of time (to be arranged by mecbanism at the air reservoirs) till the air had again escaped from the cylinders. Then the mercury would fall into its natural level in the round tube, the float would rise to its old piace, and, interrupting the electrical circuit, would let the lights go out. The time that they should remain lighted could be made to last from five to ten or more minutes after the train had passed, and thus allow the engineer of a train following it to be aware of the proximity of bis predecessor's position.

The Dawson Steel Process.

A great many new steel processes have been reported lately. One of the most recent is the Dawson process, which is said to have been tried in Cincinnati. In this process the inventor takes scrap iron or steel and treats it with a combination of chemicals while in a state of fusion in an ordinary crucible. When melted the liquid metal is cast in sand in any desired shape, the result being, we are told, the highest grade nf steel. The rolling manipulations are entirely omitted and it is found that the product has combined carhon, but in quantities so small that it would be utterly valueless under the old process.

Scientific Progress.

The Origin of Petroleum.

The following is from a lecture by William Anderson, D. C. L., F. R. S., etc., delivered recently before the Institntion of Civil Engineers, London:

Mendeleeff's theory is that petroleum is the product of the action of water on the carbides of metals at high temperatures at no very great relative depths in the crust of the earth, that this production is continually in progress, and that deposits thus actually forming may be reached in many places by sufficiently deep borings. It is somewhat humiliating when thus drawing attention to the recent rapid advance of science, and to the manner in which the engineer has adapted the discoveries of the abstract investigator to the use and convenience of man, to be obliged to confess how utterly significant are human operations with reference to the size of our planet. The deepest mine is a mere scratch on its surface, so that though the theory of Mendeleeff may he true, the question arises whether tbere be any hope that the wealth inferred to exist may be ever realized, whether the powers of the engineer will ever be so exalted as to enable him to reach those stores of combustibles which that theory supposes must exist in many localities, especially in those where the surface has heen shaken hy primeval convulsinns, and where the deposits may, therefore, he expected to lie at relatively short distances below the surface. In view of recent progress in mechanical skill, it certainly would be rash to say that borings of immensely greater deptb than any that we are as yet acquainted with will never be made, for if accumulated evidence as to the correctness of Mendeleeff's views, together with the ever-increasing cost of fuel, shall bold out hopes of success, enterprising men will be found ready to emhark their means in undertakings, the risk of which would not seem to he more formidable than those which surrounded the laying of the first Atlantic telegraph cable, and the rewards of success in which would be incomparably greater.

Separation of Iron and Alumina.

Dr. Borntrager gives an account of a metbod of separating iron and alumina in chemical determinations in the *Zeitschrift fur Analytische Chemie*. According to this method, the hydroxides are precipitated together, ignited and weighed as oxides. They are then redissolved in hydrochloric acid and made nearly neutral with potash lye, and then they are both preclpitated with neutral liquid potash soap. The precipitation must be effected in heat, and care must be taken against an excess of soap, or else the oleates will be otherwise redissolved. The resultant precipitate is filtered through a filter moistened with hot water and washed with hot water until the potassium chloride is removed. The filter is then partially dried over calcium chloride until the bulk of the water is removed. The gelatinous mass is then treated with hot petroleum until it runs off colorless, and consequently all the iron oleate has passed into solution. The filter is burnt and the residual porous snow-white alumina is weighed. As a precaution and check, the petroleum solution should be burnt and incinerated and the iron oxide weighed. Ferrous oxide may be separated from alumina in this manner without previous oxidation.

When Coal is Dangerous.

A thorough and scientific examination made by an English chemist on the effect of air and ventiiation on coal gives the follnwing results: First, the danger of spontaneous firing of coal in large lumps is very slight, but is much greater with smaller coal, and greater still with dust, the increase of danger being due to the larger extent of surface exposed to the air in proportion to the mass of tbe coal; second, air-dried coal which contains more than three per cent of moisture is dangerous, but if it contains less the danger diminishes, the moisture contained being a measure of the absorbent power of the coal for air, and the more absorbent the coal, the more dangerous; third, the danger is somewhat increased hy the presence of pyrites in large quantity; fourth, newly-won coal should be shielded from the air as much as possible to prevent chance of rapid heating, and for the same reason it is best not to stack it in large heaps, since these retain the heat; fifth, all external sources of heat, such as steam pipes, boilers and hot flues, in tbe neighborhood of coal, add very greatly to the risk, spontaneous heating becoming vastly more rapid when it is assisted from without. Of course these conclusions bave special relation to coal that is stored or shipped in cargoes.

Lithocarbon.

Litbocarbon, wbich is a mineral somewhat resembling asphalt, is the most remarkable mineral of its class known, says *Iron*. It is claimed that it makes a perfect insulator; that as a paint it will resist heat or gases of any kind; that it is capable nf being rolled into a tissue free from odor, and practically indestructible when employed in the prodnction of mackintoshes, canvas belting, waterproof tents, etc. It possesses peculiar powers, enabling it to enter and fill the pores of iron

and steel, reoderlog these metals impervious to acids, etc. It is also said to make common leather waterproof, and it can he applied to wood pnlp for the transformatioo of that material into what looks like ehony or horn. The satnration of a sbip's plates with hot lithocarbon frustrates the attack of baroacles, and the plates will oeither rust nor fonl. A portion of the smokestack of the steamer Dean Richmond, where the heat, through the nse of a hlower rises to 800° F., was painted with lithocarbon several months ago, and remaios uodisturbed and unblistered, while other parts of the vessel have oecessarily heen painted many times. A piece of sheet iron covered with lithocarbon japan is stated to have been subjected to an actual heat of 415° F. without crack or blister, and remaioed so tenacious that the iron could be bent at any angle without disturbing the glossy surface. For varnishing railway and private carriages, painting lron hridges, roofs, steamships, houses, etc., this material acts as an lnsulator, and it is reported that it will neither crack nor blister under any koown atmospheric temperature. At great heat, lithocarhon will soften, hut it will not take fire at any point.

The Tonnage of Vessels.

The generally-accepted rule for calculatiog the tonnage of vessels is known as the Morrisoo system. The system was adopted by an international commissloo at Constantinople in 1873, and was approved by 16 different nations, including the Uoited States. The system is described hy the New York *Sun* as follows:

Measure the internal capacity in cubical consents under decks, and divide it hy 100, making allowance for space occnpied by machioery, crew and stores, beginniog to measure from forward. Thls measurement must be taken in sections ahout 12 feet apart under each deck. A ton is counted in the result for every 100 cubic feet. There is some difference in allowing for engine-room space io different countries. What is known as gross tonnage lncludes space occupied by machinery and crew in the calcnlation. Ship-carpenter's tonnage is worked ont as follows:

For the length, measure from the apron to the stern timber at the upper deck; for the hreadth, take the height from the ceiling to the upper deck. Mnltiply these factors and divide the product by 100, and take three-fourths of the quotient for the tonnage sought. The American Shipmasters' Association publishes annually a record of American shipping, whicb contains precise rules and examples for calculating tonnage, and for building and classing vessels. The United States Government has a rule known as the cnstom-house measurement for obtaining tonnage, whicb will he furnished on application to any custom house.

The Longest Ocean Cable.

The longest ocean cable in the world is that of the Eastern Telegraph Company, whose system extends from England to India and measures 21,000 miles, says *Kate Field's Washington*. Africa is now completely encircled by suhmarine cables, which make up altogether a leogth of 17,000 miles. There are 11 cahles across the Nortb Atlantic, though not all of them are at present in use. Five companies control the lioes of telegraphic commnnicatlon between this country and Europe.

Light Rays in the Sea.

The depth to which the sun's rays penetrate water has heen recently determined by the aid of photography, says the *Scientific American*. It has been found that a depth of 553 feet tbe darkness was to all intents and purposes the same as that on a clear but moonless night. Sensitized plates exposed at this depth for a considerable length of time gave no evidence of light action.

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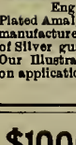

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Electricity.

Where Accumulators are Practicable.

In spite of the slow introduction of accumulators in this country, there are a great many uses to which they might be profitably put that have been pointed out to us by the practice in France and Germany, where they are in extensive use. They are considered indispensable in many of the largest central stations in those countries, although here no attempt has been made to introduce them for this work, says the Chicago *Journal of Commerce.*

It is pretty well settled that an efficient battery, whose depreciation is not too rapid, adds considerably to the economy of a central station by evening the output of the steam plant through the day.

In every station the load line is very variable; during the greater part of the day it runs fairly even at a small amount, and toward night increases abruptly to a maximum which lasts only two or three hours, and then falls off to almost nothing later in the night. This is true of almost every incandescent lighting station, and accumulotors are admirably adapted to carry the load at the times when the engines are running almost empty. By charging the batteries during the day, the load on the engines is increased to an amonnt at which they run with a higher efficiency, and the stored current may be used to carry the night load and the plant shut down. It may also be used to supplement the dynamos during the hours of heavlest load, and in this way the maximum output of a station may be made considerably greater than the capacity of its steam plant.

The use of accumulator substations has been found advantageous in a nnmber of places, and they are often used in the capacity of transformers to utilize a high-tenslon current by which they are charged during the daytime for an incandescent lighting circuit in the evening. This plan is adopted in the Papp stations in Paris, where 54 stations are all charged in series, each station having two sets of batteries, one of which is discharged while the other is being charged.

In railway work there have been a few experiments with battery cars in this country, bnt the great number of nnreliable batteries on the market, and the uncertain legal status of many of them, have been sufficient to check great progress in this direction. That storage batteries are entirely feasible for street railway work is shown by their success in Paris, where one company operating about 40 cars has found them entirely satisfactory after a test of two years' service.

Accumulators have also been found of service on trolley lines for some purposes. In Dover, N. H., the attempt was made to feed the trolley line on a steep grade some distance from the power-house with batteries, in order to run this section at a higher voltage than the rest of the line, and the plan appears to be entirely feasible. Charging batteries during the time of light load on street railway circuits for the distribution of power has also been favorably considered, and there are besides a great number of applications for which the storage battery is specially adapted. These applications are now no longer a matter of experiment, as the value of the storage battery has been thoroughly established abroad, and the absence of any progress here in this direction is invariably remarked by our foreign visitors.

To Utilize the Great Waterfall.

Quite a number of manufacturing enterprises throughout Pennsylvania and New York will move their plants in order to secure power from the Niagara Falls Power Company. This great scheme for utilizing the water power at Niagara Falls and transmitting it electrically to points some miles distant, is reported to be nearing completion. The company has taken a great number of contracts to furnish power for different plants. Various sections of the country will suffer the loss of plants projected or already in operation, as many such will be removed to points near the falls, but the general feeling seems to be that, on the whole, the benefits afforded by the enterprise will quite outweigh all such local disadvantages.

The plant which the Cataract Construction Company will put in is thus described: The system adopted is the two-phase alternating current Tesla system. After a careful stndy of the conditions under which the apparatns had to operate, the engineers of the Cataract Construction Company prepared a complete set of specifications calling for the employment of the two-phase system.

The apparatus will be built in units of 5000-horse power. The revolving field of the generator will be constructed with inwardly projecting poles and will revolve in a horizontal plane, being mounted upon the vertical shaft of the turbine.

The weight of the shaft, tnrbines and armature is to be carried by the upward pressure of the water columns producing the heads for the turbines. The electromotive force generated will be 2000 to 2400 volts and will be increased by step-up transformers for long-distance transmission and lowered by reducing transformers for distribution. The motors will be the two-phase Tesla motors which have been found to be well adapted for power pnrposes. The system adapts itself readlly to the use of motor generators or rotary transformers, so that it is possible to develop elther single-phase alternating currents or continuous currents of any desired electromotive force as may be required for the use of individnal customers. It is expected that a large amount of power will be employed for manufacturing purposes, arc and incandescent lighting, electrolytic work and power purposes generally. It is also understood that the company contemplates sending current at high electromotive forces to Buffalo and greater distances, to be used for lighting and power purposes. The work upon the apparatus has already been begnn, and it will be installed at the earliest possible date.

Electrolysis of Gas and Water Pipes.

Electrolytic action by the current from trolley tramways on the gas and water pipes appears to give some reason for uneasiness in America. It is reported that in Illinois an overhead line became gronnded through one of the iron poles carrying the span wires. The base of this was in contact with an abandoned cast-iron pipe, both being somewhat rusted. In crossing, an arc was formed which practically welded the two together. The current is said to have followed the old pipes 100 yards, where the cast-iron pipe enconntered a wrought-iron natural gas main. The pipes were melted and an opening formed so that the gas entered the old pipe, which followed the base of the iron pole. Here it caught light and issued at the top in a flame 15 feet high, quickly interrupting the traffic and melting the trolley lines.

A Definition of Electricity.

Prof. Galileo Ferraris, the genial Italian scientist, whose name is well known to all electricians, was recently asked by a young lady what electricity was, but, unlike most others when asked that qnestion, he ventured to answer it, and according to *Cosmos*, wrote in French in her autograph book the following, of which we venture to give a translation, even though the English language hardly does justice to the original French: "Maxwell has demonstrated that luminous vibrations can be nothing else than periodic verlations of electro-magnetic forces. Hertz, in proving by experiments that electromagnetic oscillations are propagated like light, has given an experimental basis to the theory of Maxwell. This gave birth to the idea that the luminiferous ether and the seat of electric and magnetic force are one and the same thing.

"This being established, I can now, my my dear young lady, reply to the question that you put to me: What is electricity?

"It is not only the formidable agent which now and then shatters and tears the atmosphere, terrifying you with its crash of thunder, but it is also the life-giving agent which sends from heaven to earth, with the light and the heat, the magic of colors and the breath of life. It is that which makes your heart heat to the palpitations of the outside world, it is that which has the power to transmit to your soul the enchantment of a look and the grace of a smile."

Manganine for Coils.

On account of its high specific resistance and small negative temperature-coefficient, manganine, composed of copper, 83 per cent; nickel, 4 per cent; and manganese, 13 per cent, is stated by a German physician to be especially vainable in the manufacture of resistant colls. He found that after such a coil had been heated to about 212° F., its resistance was diminished by from 0·4 to 0 8 per cent; but on repeating the process the alteration became less and less, until it amounted to no more than 1·20,000 of the whole. He recommends, therefore, that the coils should be heated to 225° and kept at that temperature for some hours every month, in order to get rid of the molecular disturbances due to the processes of manufacture, and that they should be well paraffined to preserve the alloy from air and moisture.

The Poor Man's Light.

Electricity will eventually provide the poor man's light, Mr. Preece is reported to have said, and we think it is a reasonable prophecy, says *Invention.* The management and control of the electric motor is simple, its service is in direct and immediate command, it requires no fuel, in economy of space occupied has no competitor, and in some cases, where needed for intermittent use, power can be furnished at one-tenth to one-fifth the cost of steam. An American contemporary points out that the electric motor has found its way into plumbing, metal spinning and machine shops in New York, and considers that there can he no grave doubt as to its more general adoption.

Useful Information.

Horses Should Wear Light Shoes.

Horses are commonly made to carry too heavy shoes. The shoe is designed merely to protect the hoof, and the lighter it can be made and still serve its purpose, the better for the horse, says the *American Agriculturist.* Horses that are devoted to farm work, and on land where there are few or no stones, may dispense with shoes, except while the ground is frozen. This would be of great advantage to the horse, to say nothing of the saving in the horseshoer's bill. But most horses require shoeing, and the shoes worn are heavy iron ones. Steel shoes can be made lighter, will wear longer, and the first cost is not so much more that it need prevent their being used. Light horses and driving horses should always use them. For horses of 1100 pounds weight, and with well-shaped upright feet, the fore shoes should weigh about one pound each, and the hind ones 12 ounces. If four ounces are added to each shoe, let us see what a difference it will make. In plowing, cultivating, mowing, reaping and many other farm operations, a horse will walk from 10 to 20 miles a day, and advance about four feet at each step. At each step the horse lifts half a pound extra on its two feet, or 666 pounds in every mile. In a day's work of 15 miles, the horse would lift 9900 pounds extra, or nearly five tons. If the force required to lift this five tons of iron could be expended in the work the horse is doing, much more could be accomplished. In the light of these facts, is it any wonder that when young horses begin to wear shoes they soon become leg weary, have their step shortened and acquire a slower walking gait?

Cutting and Polishing Gems.

In the cutting and polishing of gems generally, the artificer is provided with a small mill the arrangement of which is such as to enable him to keep a flat plate rotating in a horizontal direction, says *Work.* The upper surface of the mill-plate is that on which the grinding of the gem is conducted, and the plate is, therefore, formed of material adapted to the kind of gem. The diamond requires a mill-plate of steel. Gems of the next degree of hardness, such as the sapphires and ruby, require a mill-plate of copper. Somewhat softer gems, such as the beryl, topaz, amethyst, garnet and hyacinth, require a leaden mill-plate. The softest kinds, such as quartz, opal, and artificial gems, require a mill-plate of wood. These distinctions arise from the circumstance that the mill-plate for grinding each gem must be proportional in hardness to, but not so hard as, the gem to be ground. The gem to be ground is cemented to one end of a small rod, and the artificer, having the means of giving a rapid rotatory motion to the mill-plate, applies the gem to it, and grinds away the substance of the gem according to the kind of effect required to be produced. For grinding diamonds, sapphires and rubies, the mill-plate is touched with a little diamond powder and oil to give the requisite abrading power; for emeralds, beryls, topazes, garnets, hyacinths, and all the softer gems, emery and water are applied to the plate. The grinding wears away the surface of the gem in various parts but the new surface thus produced is dull. To impart lustre the gem is polished on softer mill-plates with tripoli powder and water.

A Pumice Stone Mine.

A mine of pumice stone exists on the Teneriffe peak, of which the working was only started in 1888, says the *Manufacturers' Gazette.* The stone is found in that part of the peak called the "Canadas," at about 2000 feet above sea level, which as an area of some 6000 hectares, out of the middle of which rises the highest part of the peak. The Russian consul at St. Croix bought this property from the Spanish Government in consideration of an annual payment for the pumice stone working. The Russian consul has associated himself with a Belgian, and they, under the firm styled Aguilar & Valcke, commenced operations in 1888, but it was only last year that exportation was really started. At the Paris Exhibition, the consul-general states, this stone obtained a silver medal, and in view of the requirements of England, France and America, he believes it will develop a trade of great importance before many years. So far the Lipari islands have practically furnished the world's supply of this product, exporting about 100,000 tons per annum. The Teneriffe stone, being recognized as of excellent quality, and its extraction being of a much more simple matter than in the Lipari islands, it follows that the price is much less.

The Corinth Canal.

The Corinth canal, says U. S. Consul George Horton of Athens, will abridge by 185 nautical miles the route of vessels bound from the Adriatic to Constantinople, and will save 95 miles in the case of vessels bound from Mediterranean ports. As before stated in these columns the canal was commenced

in 1881 under a concession granted to Gen. Turr by the Greek government; hut the original company having failed another was formed wlth French capital and the canal was officially opened on Aug. 6, 1893. The present company has a capltal of 5,000,000 francs. It is estimated that the annual traffic througb the canal will amonnt to 4,500,000 tons, paying 1 franc from the Adrlatic and ½ franc from elsewhere. One franc will he charged for each person on a passing ship. The company's lease is for 99 years, and at the expiration of this time the canal becomes the property of the government on the payment of 5,000,000 francs to the company. The canal itself is 21,441 feet long, 68.9 feet wide at the hottom and 70.8 feet wide at tbe surface and 26.24 feet deep.

American Manufacture of Alkali.

The greatest difficulty encountered in alkali manufactnre in this conntry is that of temperature, the extreme cold in winter and the great beat in summer, says an excbange. In order to overcome the troubles caused by excessively varying temperature, a large factory whicb is now being constructed in Virginia will be built in a huge excavation in the side of a mountain, and here the bleach chambers will he erected. Tbe property is nnderlaid by a fine deposit of rock salt, and has a surface of excellent limestone. There is plenty of good timber, and not distant coal fields will supply fnel at cheap rates.

The methods of alkali manufacture hitherto in vogue bave been tedious, crude and expensive, and tbe introduction of electricity into the industry opens out new and remarkable possibilities. The electrolytic process of the decomposition of common salt by electrolysis, is the only direct means of producing by one operation caustic soda and chlorine gas.

The value of this process can he seen by comparing its results with those of the old methods. By one standard process 18 cwt. of salt will give one ton of salt cake, but it requires two tons of salt cake to yield one ton of caustic, and therefore 30 cwt. of salt is required to make one ton of caustic and 16 cwt. of hleaching powder. By electrolysis it is calculated that 36 cwt. of salt will yield one ton 16 cwt. of caustic soda and two tons six cwt. of hleach.

Work a Horse Will Do.

A horse will travel 400 yards in 4½ minutes at a walk; 400 yards in two minntes at a trot; 400 yards in one minute at a gallop, says an exchange. Tbe nsual work of a horse is taken at 22,500 pounds raised one foot per minute for eight hours per day. A horse will carry 250 pounds 25 miles per day of eight hours. An average draught horse will draw 1600 pounds 23 miles per day on a level road, weigbt of wagon included. Tbe average weight of a borse is 1000 pounds, and his strengtb is equivalent to that of five men. The greatest amount a horse can pull in a horizontal line is 900 pounds, hut he can only do this momentarily; in continued exertion prohably half of this is the limit. He attains his growth in five years, will live 25, average 16 years. A horse will live 25 days on water without food, 17 days without eating or drinkIng, but only five days on solid food without drinking.

A Loud-Sounding Telephone.

An Englishman is credited with the invention of a telephone which will talk loud enough for a person in any part of a large room to hear and nnderstand what is said. This is accomplished not so mucb by an improvement on the existing telephones, as by the method of arranging the circuit and bringing its resistance as low as possible. For this purpose the usual induction coil is discarded, and the two instruments, transmitter and receiver, are directly connected in circuit witb tbe line and the battery.

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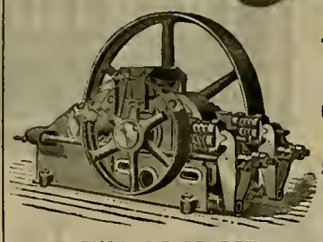

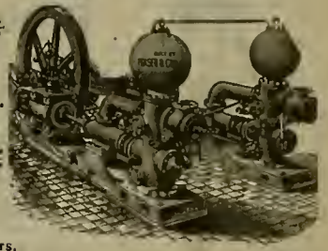

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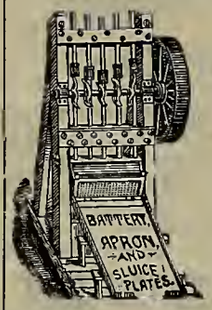

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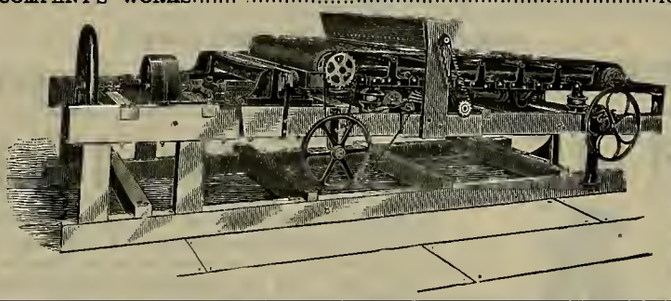

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The Sierra Buttes Company's Mines.

The Sierra Buttes Mining Company (English) which has for many years been operating the Sierra Buttes and Plumas Eureka mines in Plumas county, and which now owns the Uncle Sam in Shasta, seems to have made a fortunate purchase in the latter. The stockholders held a meeting in London last month and heard the report of the Chairman, Mr. Frederick Tendron, and the directors. The profit made by the Sierra Buttes for the preceding half year was $4500; in Plumas Eureka, $9000; Uncle Sam, $45,000. The profit in Sierra Buttes was realized from ore in pillars and in parts that had not been considered of sufficient value to work years ago. The working of this old ore has now gone on three years and it is hoped to be able to continue for some time yet.

In the Plumas Eureka the ore is of exceedingly poor quality, but the supply is abundant, and it is possible to realize a profit. Whether it will continue is exceedingly doubtful. But a discovery is hoped for. But it is the Uncle Sam which has made a fine showing. Says the Chairman in part: "The total crushed since we took over Uncle Sam has been 58,636 tons, and the gold taken from the ore amounted to nearly $600,000, and there was a profit on that of nearly $250,000. The average value of the ore for the whole period (much the best way of dealing with it) has been $9.50 a ton, and the net profit $4, showing the working cost, including the London expenses and everything, to be $5.50. The average for the past half year has kept up higher than we could have expected. It has been $9.20 a ton, and the working cost has been reduced to $4.85. What we look forward to is chiefly the reduction in the working cost by putting up a Huntington pan to crush some of the poorer ores, for the essential thing is to make the mine last as long as we can and get a good profit out of it the whole time. When you consider that the Uncle Sam was bought for $150,000, and after spending $60,000 on buildings, mills, chlorination works and development, you have had in dividends and reserve $240,000, you certainly have no reason to regret the purchase of Uncle Sam. (Cheers.) When in addition to that I tell you, that, as far as they can judge out there they have at least six years' ore in sight of the same quality as that which in less than four years has given us $240,000 profit, you must all be very anxious that they should find us another Uncle Sam.

"In the western part of the mine Capt. James and Mr. Johns estimate that we have at least 100,000 tons of ore. Now, as we know the quality of the ore from past experience in various parts of the workings I do not think they are at all exaggerating, either as regards quantity or value. In the eastern parts of the mine they also tell us that upward, in two shoots, they have nearly the same quantity of ore as they have worked out during the last few years. Consequently you may take it that we have more than three years' supply, because we have not only the unworked portion of the stopes to surface, but another body of ore some distance farther on, which they have only passed through for 100 feet, and they tell us they have not worked there, because they have no place to dump the stuff conveniently as they take it out. Now, whenever they do not work a body of ore I am suspicious that it is on account of its poor quality, and I am so in this instance. They only went through 100 feet on the third shoot, but there is a certain quantity there, and there are croppings that would justify us in thinking that it makes up to the surface. In the two shoots at the No. 2 level we have an ore body something like 500 feet long. When we go down to the 2½-foot level the shoot is only 130 feet long, and another is only 25 feet, but when we go another 220 feet lower, the ore they have laid open there is something like 25 feet. Here comes an important question to which I have often referred as to the making down of these reefs. I remember perfectly well when I was out there many years ago, Mr. Johns showing me a shoot that was going down from seven to eight feet wide in the Buttes mine, the pay part of which had suddenly jumped away from them. They had gone down in a winze and missed it, and yet it was only a few feet from where they had sunk. In the Eureka mine for years they were within a few feet of the famous Treznna shoot, which gave $330,000 profit. I do not believe they are in the right fissure to find this shoot in depth. I do not believe the shoots have died out, but that there is another fissure. If you look at the ground plan you will see that, instead of the vein continuing in a more or less straight line, the center of it is all pushed forward, and there is a cross-course. In all probability that pushing forward of a large mass of the mountain has occurred in depth, and the continuation of the vein from the western to the eastern side like that would be in the forward direction in which it had been pushed. Where they have driven is, on the contrary, nearer the vertical, and my belief is that it will be found a fair distance in a northerly direction from where they have up to the present time driven, and what we shall suggest to Mr. Johns is that from this small body of ore of 25 feet, representing a second eastern shoot, he shall crosscut at right angles to the vein, or as nearly as possible in a northwesterly direction for a considerable distance until he proves clearly that there is or is not another fissure. The expense is small and will only amount to a few hundred pounds, which is nothing, if by such an outlay we lay open a body of ore for years to come; and, if it does not do this, we have simply done our duty as miners in exploring the ground thoroughly. The natural feeling of a mining captain, when he has a large supply of ore already laid open, is to make as big a return as possible, and so he wants a little pressure put upon him from home, to make him really understand that exploratory work is work that should be done in your days of prosperity.

"I may give you these interesting figures as I have done before: We have paid in dividends in the Buttes and Eureka £14,000, and we have for reserve fund for the two mines and first-class securities £2,000."

The stockholders extended a vote of thanks to Mr. Johns, Capt. Jenkins, Capt. James, and to the other officers of the mine here and in London.

The Sierra Buttes company has bonded the Whitlock mine, in Mariposa county, for nine months, and is now engaged in pumping out the water. The purchase price has been agreed upon at $100,000.

Books Received.

We have received for review the following books from Osborn & Alexander, publishers' agents, 401 Market St., San Francisco:

"A Text-Book of Coal Mining, for the Use of Colliery Managers and Others." By Herbert W. Hughs. Chas. Griffin & Co. and J. B. Lippincott, Publishers. Price, $6.

"The Assayers' Guide; or Practical Directions to Assayers, Miners and Smelters." By Oscar M. Lieber. H. C. Baird & Co., Publishers. Price, $1.50.

"Origioal Papers on Dynamo Machinery and Allied Subjects." By Jno. Hopkinson. W. J. Johnston Co. and Whittaker & Co., Publishers. Price, $1.

"Ice-Making Machines." Translated from the French of M. Ledoux. Revised and Transformed to English Units by Denton, Jacobus & Riesenberger. Publishers, D. Van Nostrand Co. Price, 50 cents.

Profusely Illustrated with Plates, Diagrams and Engravings.

BACK FILES of the MINING AND SCIENTIFIC PRESS (unbound) can be had for $3 per volume of six months. Per year (two volumes) $5. Inserted in Dewey's patent binder, 50 cents additional per volume.

Coast Industrial Notes.

—Placer county has a broad-tire ordinance.

—Los Angeles is taking steps to improve the fire-alarm system of the city.

—Ninety-eight cars of beans were shipped last week from southern California.

—The electric street lights of San Bernardino cost that city $5.90 each a month.

—The Petaluma starch factory, after a delay of several months, started up Wednesday.

—The output of Everett, Wash., for the year was: Lumber, 23,300,000 feet; shingles, 92,000,000.

—There is a company at work in Tulare county looking for oil. A shaft has been put down 40 feet.

—The San Diego City Council has voted in favor of city ownership of the electric lighting plant.

—Whatcom county, Wash., will need to raise about $200,000 on its assessed valuation of $12,951,000.

—Work on the Montana Southern railroad is progressing. Eight miles of the road have been graded.

—There is under consideration a plan to have an overhead driveway on the new bridge over the Sacramento river.

—The Huntington-Hopkins Company of this city, which was recently reported to be retiring from business, announces that it has no such intention.

—The Sepulveda Rancho and the Rancho Jurupa, near Riverside, have been sold to the Riverside Sierra Company for $700,000. The ranchos contain 20,000 acres.

—The steamer Idaho, which was sunk in Kootenai lake on the 10th inst., has been raised by wreckers, who purchased her, after she sank, for $350. She cost $30,000.

—The La Punta Salt Works, located on the low land at the head of San Diego bay, has made this year 650 tons of salt, which is a larger production than that of any previous year.

—To protect the striped bass, it is proposed for the supervisors of the various California counties to pass ordinances making it a misdemeanor to take fish weighing less than three pounds.

—A company has been organized to float logs down the Mokelumne river. It is proposed to clean out the channel of the stream, and a 30-years lease is wanted by the company. If successful, this will open up a great timber region.

—Experts claim to have found a shortage of over $1,000,000 in the value of the water plant recently purchased by the city of Tacoma from C. B. Wright of Philadelphia for $1,750,000. The experts place the value of the plant at $740,000.

—C. W. Hinchcliffe, special agent of the Sunset Telephone Company, is at Willows for the purpose of placing a system of telephones in that is entirely new. By this system subscribers will be entirely independent of the local central office.

—At a meeting of the directors of the newly organized Farmers' and Merchants' Bank of Woodland, Yolo county, D. N. Hershey was elected president, C. G. Day, vice-president, and R. H. Beamer cashier. The bank has just completed a three-story frame building.

—The first shipment of the largest purchase of apples ever made in Grant county, Or., arrived in Baker City the other day by eight six-horse freight teams, and other teams are on the way. The entire consignment consists of 8000 boxes. The fruit will be shipped to Denver, Colo.

—Allen C. Mason of Tacoma has given an option on land in the Commencement Bay Addition to a railway, supposed to be the Great Northern, for terminals. It is understood the line will be extended to Tacoma soon. According to the agreement, the road must be in operation by July 1st.

—The Pullman (Wash) Hardware Company has passed into the hands of a receiver. The company asked for a receiver to protect their creditors. D. F. Staley, cashier of the Pullman State Bank; is receiver. The liabilities will aggregate about $30,000, with assets reaching nearly $60,000.

—A lease of 25 freight locomotives from Burham, Willlams & Co., proprietors of the Baldwin Locomotive Works of Philadelphia, to the Atlantic & Pacific Railroad has been filed in the San Bernardino County Recorder's office. The value of each locomotive is $9810. The lease is for a term of two years.

—An engineer corps of the Monterey and Fresno railroad, under charge of Chief Engineer P. P. Dandridge, is about to locate a permanent line through the Coast Range and across the San Joaquin plains to Fresno. The corps expects to reach the latter point in four weeks. This completes the entire permanent location and the road will be put under contract as soon thereafter as practicable.

—The shingle men of Washington and Oregon met at Seattle Wednesday, two-thirds of the mills being represented, and adopted the outline of a plan for organization of the new association, which will control the production and maintain prices. It will have many of the features of a trust. A committee is preparing a constitution. It was decided not to sell any more shingles for shipment or delivery after January 1st until the organization is completed. It is the intention to raise prices.

—The Esquimalt Marine Railway Company of Victoria capitalists, with W. F. Bullen as managing director and $100,000 capital, have begun the construction is Esquimalt harbor of a marine railway for docking and repairing vessels cheaper than by the usual dry-dock methods. Vessels up to 300 feet long and 19 feet in depth will be floated on a cradle, fastened by patent blocking and then pulled up an inclined railway 700 feet long on six tracks by powerful machinery. Shops for repairing machinery and woodwork will be erected, the whole to cost $60,000. The plant will be in readiness for operation in February.

—The Sacramento-street cable road, a part of the Presidio and Ferries Railway system, is to be extended beyond Central avenue to D street and the Midwinter Fair grounds. Surveyors have began work at the Sacramento-street end of the proposed extension and have gone over the right of way from the present terminus of the cable line at Walnut and Sacramento streets, on the latter to First avenue, and thence to Lake street, Sixth avenue, D street and the park and fair ground entrance. The extension runs a little over a mile, and is to be completed and running by the first of the year in time for the opening of the Midwinter Exposition.

—The Government contract for excavating a new mouth to the Yuba river, which has been in progress for three months, is completed, and a portion of the river was turned into the canal, which empties into the Feather river 2600 feet southwest, in which distance there is almost eight feet fall. The work is very satisfactory and indicates that it will be a means of relieving much outside pressure on the levees this winter in the event of high water. Since the water was turned in the Yuba has lowered almost six inches, and the Feather has fallen even more than that, which indicates favorable results in scouring out the Feather river below the mouth of the Yuba, something long desired by orchardists on the river bottoms north of Marysville.

—M. S. Lowenthal estimates the salmon pack for the season of 1893 as follows:

Location.		Cases.
Columbia River		365,700
Rogue River		3,109
Oregon (Fall) estimated		20,000
Alaska (including shipments to Oregon):	Cases.	
Red	471,436	
King	38,731	
Silver	126.953	637,120
British Columbia:		
Fraser River	425,200	
Northern Rivers	123,600	548,800
Fraser River (outside):		
Stockeyes	50,650	
Cohoes	10,500	61,150
Grand Total		1,635,879

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING NOVEMBER 7, 1893.

508,267.—LATCH AND LOCK—J. E. Armstrong, Santa Cruz, Cal.

508,270.—SEPARATOR—A. F. L. Bell, S. F.

508,275.—SAFETY GAS COCK.—L. Brodt, Oakland, Cal.

507,991.—FRUIT CRATE.—H. E. Bullock, Oakland, Cal.

508,279.—PRESERVING FILES—Jas. Cass, Cayucas, Cal.

508,280.—GIRDER SUPPORT—F. Cavallaro, San Jose, Cal.

507 998.—BUCK RAKE—C. Coulthard, Emmett, Cal.

508,007.—BOILER—F. X. Fisher Oakland, Cal.

508,008.—ORE GRINDER—O. A. Gellen, S. F.

508,331.—SMELTING FURNACE—J. L. Giroux, Jerome, A. T.

508,333.—PROPELLER—A. P. Gordon, S. F.

508,309.—HOOP-SAWING MACAINE—E. O. Hall, Marshfield, Or.

508,389.—SASH FASTENER—F. C. Immel, S. F.

508,320.—OCEAN POWER—R. L. Johansen, Los Angeles, Cal.

508,178.—DEHORNER—J. Miller, Vancouver, Wash.

508,332.—CAN OPENER—C. Morgan, Latah, Wash.

508,113.—FRUIT DRIER—J. H. Monteith, Los Angeles, Cal.

508,349.—WRITING TABLET—B. W. Scott, San Jose, Cal.

22,869.—DESIGN FOR BOOKHOLDER—W. O. Willl, Sacramento, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

On the Osceola Tunnel.—*Record*, Nov. 9: The contractors on the Osceola tunnel are driving ahead with results satisfactory to themselves at least. Messrs. Tripp and Ross are still prospecting on the Trumpet. Mr. Tripp tells me that he can see free gold in the rock as far as gone and is very much pleased with his prospects.

The Bay State people are pushing the matter of their concrete bulkhead to completion as fast as they can. Superintendent Jones informs me that he hopes to have everything in readiness for the contractors by the 10th instant. Dr. Boyson, a heavy stockholder, visited the mine last week and seemed to be very much pleased with the way the work is carried on.

Butte.

Another New Mill.—Oroville *Mercury*, Nov. 11: J. D. Clemens and Frank Willet of Forbestown have completed the purchase of a ten-stamp quartz mill of Perkins & Wise. The mill was bought for the Bullion Consolidated Quartz Mining Company of Forbestown. This company organized last week with the following officers: Frank Willet, president; J. T. Clemens, treasurer; Chas. Bovear, secretary; John Pellar, foreman; John Crossmen, W. Kendall, Wm. Smitheron and Thos. Stocker, directors.

The company, which is composed of practical miners and mill men, have bonded from L. K. Reesoner his quartz property consisting of four ledges upon which considerable development work has been done. The property was recently under bond to an English company who gave it up because the ledge was not extensive enough to justify the erection of an 80-stamp mill. It was found, however, to be a very rich ledge extensive enough to warrent the building of a small mill. The miners above named consequently secured an option on the mine for $10,000, have bought the mill and expect to have it running within six weeks. It will be run by water power, and they claim to have enough ore in sight to pay for the property in six months.

Calaveras.

Coming to the Front Again.—*Chronicle*, Nov. 11: Messrs. Hevens and Ewing of San Francisco, gentlemen who have been reered in mines, and with an experience that has proven profitable, have been looking about this section, and on Thursday last concluded negotiations for the North Star placer mine, owned by the Messrs. McGuire of Heppy Velley. This property consists of 69 acres, U. S. patent. For the past 30 years Mr. McGuire has been working by drift process on the north end of the claim, using the old-style hand windlass for hoisting dirt and water, and reared a large family from the profits of his work. But as work was prosecuted south, the grade of the channel running that way, water forced him to suspend operations. The new company will proceed at once to put on a first-class hydraulic plant and tear away all this drifted ground, and thus have the face opened as a new mine for drifting purposes. This will cause to be built an extensive flume some 1200 feet in length; 700 feet of pipe will also be laid to convey water from the Mokelumne canal, under a pressure of 200 feet. Lumber and tools will be on hand next Monday to commence fitting up. Charge of the mine is in the hands of C. M. Burleson, Esq., of this place.

The claim formerly worked and owned by Messrs. Starr & Mattison, located in Chili gulch, one mile from this place, will be reopened at once. The mine was formerly worked by an incline shaft, with drift at head 4000 feet long penetrating Stockton hill. After many years' working, the owners closed the mine, sold their machinery, and practically abandoned the property. The company in former years had litigation with the late Jas. Duryea over ten acres of mining ground, which both parties claimed, resulting in a victory for Jas. Duryea.

This property was considered "rich," and located near the foot of their incline. John Jackson, Esq., has been employed to superintend the work. This ten acres of land secured, work will be commenced next Monday for opening the claim.

The Fairchild property, near Glencoe, a hydraulic proposition, shows a fine body of gravel, which is being worked by ground-sluice process by Mr. Fairchild with good results; it will be opened up systematically with a good hydraulic plant. A strong company have concluded arrangements for the purchase of the property, and will, about Dec. 1st, have things moving actively.

The old "Butcher John" mine, a quartz property near the Fairchild mine, is operated by Mr. Tyson of San Francisco. They cleaned out the old shaft, and have a fine steam hoist and pump, have erected good buildings and are taking out some high-grade rock from their deep workings, which, in fact, is of great importance to the miners of this district. Mr. Tyson has secured an eight-stamp mill, which stands about one mile from his mine, and will transport ore for treatment.

Col. Barstow of San Francisco has secured the old New York Flat quartz mine, located between Glencoe and Independence. The record of this mine is O. K.; has a shaft down 300 feet, with two veins running parallel, one of which pays $30 per ton. The mine is to be equipped with modern improved machinery, which is now on the way from San Francisco, some 70 tons being in transit. Electric power will be used, the plant to be located on the Mokelumne river some six miles distant.

All the knowing miners of Glencoe and Railroad Flat district speek highly and with confidence of the New York mine, and we believe that Mr. Berstow will succeed.

The above enterprises are the principal events of the week, yet we have scores of new men looking about for locations, and expect to see many more new enterprises opened up in the near future. We can thank our friend Grover Cleveland for this young boom, if we may so call it, for these parties are largely ex-silver-miners, the first of whom, Havens & Ewing, having been identified with silver-mining for 25 years.

Nevada.

Good Clean-up.—Grass Valley *Telegraph*, Nov. 2: Friday a clean-up from a crushing of 78 loads of rock taken from the Wisconsin ledge was made at Southern's mill and the result was that the rock paid $40 a load.

The mine is being worked by a company of lessees and the lease has 15 months to run yet. Those comprising the company are John Feeney, Teegne Looney, Tim Hurley, Martin Nilon, Thomas Jones, Geo. Murphy, Pat Feeney and Jas. Vivien. The company also employs several men. It was necessary for the company to do considerable dead work before a crushing could be taken out, but wages were made by those interested, and the next crushing will make quite a stake for the company.

The Wisconsin was located in 1854 by Joseph Dewson, who named it after his native State. In 1856 a 9-stamp mill and hoising and pumping machinery were erected, the cost of which was $11,000. A perpendicular shaft was sunk 60 feet the same year, and a drift was run for the ledge and 700 tons of rock taken out which paid $68 per ton. In 1857 the shaft was sunk a depth of 110 feet, and some portions of it cost $100 per foot to sink.

Then the mine became entangled in litigation, and in 1859 E. McLenghlin, Geo. A. Montgomery and Wm. Loutzenheiser became the owners. It is at present owned by the Menlo Company.

Mine Bonded.—Grass Valley *Union*: The Lemerque mine, owned by Capt. S. H. Dille, Wm. Lontzenheiser and Robert Kemp, has been bonded to a company represented by P. P. McAuslend of Nevada City, and this morning work will be commenced by cleaning out the shaft. Very shortly suitable machinery will be placed on the mine. The property adjoins the North Star on the south and the ledge is parallel to that of the North Star. The Lamerque was worked to some extent in the early days and crushings of ore from the mine yielded as high as $70 to the ton.

The Centennial.—*Transcript*: M. Kinzle, superintendent of the Centennial gravel mine, writes to the Virginia City stockholders as follows: "We have nothing of special importance to relate this time, but are busy pushing ahead in our second crosscut, the bedrock showing very favorable. The gravel is about the same, working freer and giving good coarse gold prospects. We shall have it in the top of the crosscut shortly. It is coarser than we found it in the front channel, with plenty of round wash quartz pebbles and bowlders. We have had two days of big rain, but no snow. With plenty of water this winter, old Nevada county will beat all her past records in gold production."

The South Idaho.—*Union*: Drifting was commenced at the South Idaho mine this week from the 140-foot station. In the drift is a ledge varying in size from 18 to 20 inches. It shows some free gold, but is especially valuable for its sulphurets.

Started Up.—*Transcript*, Nov. 9: Tuesday the hoisting works and mill at the German mine, near Washington, were started up. It is the company's intention to rush work ahead as fast as possible. About 25 men are employed now and the force will be increased as work progresses. The mine has been idle some time.

Placer.

Started Up.—*Argus*, Nov. 11: The Mayflower started on full time again on Tuesday last. The company has just finished putting in new mortars and making many other repairs, which practically makes the mill as good as new. It is about eight weeks since these improvements began, and a lay-off had to be given to nearly half the force during that time in consequence.

J. B. Patterson, superintendent of the Golden Rule mine, was up on Monday. The mine is situated in this county directly opposite the famous Zentgraf mine. A late crushing from the outcroppings yielded $15 per ton. Mr. Patterson is pushing the tunnel forward, and will reach the main ledge in a few days. The indications are first-class.

Shasta.

Two Good Strikes.—Redding *Free Press*: Johnny Franck and Johnny Kelly, who purchased the Tom Greene mine on Deadwood, have made a rich strike a few feet from where the former owners ceased work. A four-foot ledge has been uncovered, and the ore will go $100 to the ton in free gold. Mr. Greene took out a great deal of money from this mine, and it is believed that the present owners, who are miners of pluck and experience, will do well. Their predecessors—Joost, Drexel and Mills—could not agree among themselves and gave up the property.

Peter Scherer has again struck it rich on the Old Tellurium. The secretary of the company, Mr. Jones, informs us that the strike is on the hill on the Eureka ground, and that in sinking an incline shaft to crosscut the ledge they ran across a two-and-a-half-foot ledge of free gold. The shaft is down 125 feet.

Sierra.

Promises Well.—Nevada *Transcript*, Nov. 8: The quartz mine recently purchased in Sierra county by ... E. Head and Robert McMurray gives every indication of proving a valuable property. A shaft has been sunk 60 feet, and ledge five feet in width uncovered. The quartz is well filled with sulphurets and shows considerable free gold. The mine is known as the Idaho, and it is thought that it will in time rival its famous namesake in Grass Valley district. It is situated between the Oriental and Rainbow mines, two of the richest quartz properties ever discovered in that part of the country.

In the spring the owners will put up heavy machinery and get ready to work the mine on an extensive scale.

Siskiyou.

All Doing Well.—Yreka *Journal*: All the miners on the Klamath river are now doing good work with excellent success in taking out gold-dust at their several claims, the weather being fine for carrying on mining operations in that stream. The same may be said of miners along Humbug creek and other tributaries of the Klamath throughout the county and in Trinity county adjoining.

The Greenhorn blue gravel mine still continues to yield the usual average pay each day, and will continue the same average of $100 a day until more water is obtainable by winter storms to double that amount in being then able to put on more men.

Thomes Orr is getting ready to reopen the old Siskiyou quartz ledge on Humbug creek, and has teams engaged in hauling supplies and apparatus required, so as to continue operation during the winter season. This ledge has developed fine prospects, and will no doubt yield valuable returns of gold when the quartz taken out is crushed.

Tuolumne.

The Rawhide.—*Independent*, Nov. 11: This mine is still in bonanza, and thousands of dollars are being extracted daily. It is reported in Sonora that a wheelbarrow full of almost solid bullion was taken from the mine and wheeled to the house.

The Clio.—Tuolumne *Independent*: The best work done on this property was about two years ago, when a tunnel was run 400 feet. The shoot is long and pays well to work. A substantial mill of ten stamps is on the mine. Mr. Heath, the owner, now in the East, will return to this county and resume operations some time in January.

Webster.—This is a good mine, and considerable work has been done on the property. Two tunnels are run, respectively 250 and 125 feet in length. The croppings from the mine paid $6.50 per ton, while some of the ore has yielded as high as $28 per ton from the lowest tunnel level. The property is not worked at present, but has been bonded, and bids fair to commence work in a short time.

Eagle.—The above mine is located in Blue Gulch, on the east vein of the mother lode. There is a ten-stemp mill on the property, which was kept fully employed crushing for years. The rock paid splendidly. The general average of the rock on the dump at the present time will yield about $25 per ton. The mine is opened by a tunnel and shaft, but they have not been worked for years. The property is bonded, and is thought by many old and experienced miners to be one of the best mines on the mother lode.

Stanley.—This mine has a large body of low-grade ore that will mill and was milled for $4 per ton, taken from an open quarry nearly 300 feet wide. The ten-stamp mill on the property is too small for such a vast deposit, for if a hundred-stamp mill could be placed on this mine it would be a bonanza. A good water power could be obtained at little cost.

Glanstone.—This mine is owned by Thos. Whitto. Thirty thousand dollars have been extracted from a dyke vein. Not working, as the owner is doing assessment work on another mine.

NEVADA.

Washoe District.

Resumption of Work in Gold Hill.—Virginia City *Chronicle*: The Gold Hill mines are preparing to open up again. Assessments are being paid in, and in all likelihood work on a small scale will be resumed in all of them before long. On Sunday shaftmen were put to work in the Crown Point to prepare for the opening of that mine, and it is reported that the Jacket and Belcher will shortly follow suit with preparatory work.

Summary of Comstock Operations.—The official letter from the Consolidated California and Virginia mine for the past week says: "The work of repairing the Consolidated Virginia shaft has been carried on diligently and with as large a force of men as could be employed to advantage. The shaft is now completely repaired a distance of 900 feet below the surface, and with our present progress we anticipate the repairs for the remaining distance to the 1000 level station point will be completed early in the coming week. The next step will be to put in place the air pipe from the station point up to the surface, which will consume about two days' time, and then will follow the work of cutting out the station from which the proposed drift will be started." On the 1650-foot level the north drift from the upraise is now cutting some quartz assaying from $9 to $10 per ton. From the openings from the winze below the 1650 level and from the eighth floor in the upraise above that level about 18 tons of ore assaying $19.61 per ton were extracted during the week.

In the Ophir mine the west crosscut from the main north drift on the 1465-foot level continues in a porphyry formation, carrying streaks of quartz. In the Mexican mine an upraise has been started at a point 40 feet west from the main north drift on the 1465 level, and 100 feet north of the Ophir line, and is in 16 feet in porphyry, clay and quartz. On the 900 level of the Union shaft the repairs to the joint Sierra Nevada and Union Con. north drift from the joint west drift will be completed about the middle of this week. The flow of water from the face is decreasing. On Cedar Hill the south drift from the Sierra Nevada intermediate tunnel is in 200 feet with the face in hard porphyry. In the Andes mine a west crosscut is being started from the end of the north drift on the 420 level to explore a body of quartz.

In the Best & Belcher mine all repairs to the north drift on the 900-foot level are completed and an east crosscut has been started on the Con. California and Virginia line and advanced 16 feet, passing through soft porphyry. In the Hale & Norcross mine the winze below the 1300 level is down 51 feet. Extracted during the week 12 cars of ore assaying $34.20 per ton, and five cars of ore assaying $15.92 per ton. In the Choller mine a new east crosscut has been started from the north drift, 145 feet south of the north boundary line on the 100-foot level and is out 15 feet, with the face in vein material. In the Potosi mine the east crosscut, 200 feet north of the south line, 700 level, is out 36 feet and the face is in low-grade quartz. Extracted and sent to the mill the past week 155 tons and 250 pounds of ore from the 1100 level; milled during the week 153 tons. On hand at mill 56 tons and 1700 pounds. Average battery assays $19 97, average car sample assays $25 68. The west drift from the station 820 level, Ward shaft is out 290 feet; face in porphyry.

BRITISH COLUMBIA.

Fortunes in Gravel.—Spokane *Review*, Nov. 12: Operations have been practically suspended for the winter at the mammoth placer mines of the Kootenai Hydraulic Mining Company on the Pend d'Oreille and Salmon rivers, in British Columbia. A rise in the Pend d'Oreille washed out the foundation under the boxes, set on gravel. "This was of little consequence, however," said President George Goodhue last night. "We had finished the test and accomplished all that we started in to do this year. We haven't been working this season for pay, but will begin operations on a large scale in the spring at Seven and Fifteen Mile creeks and work the gravel for all there is in it. We have fully demonstrated the fact to our own satisfaction, at least, that we have pay ground. We will keep a force of 10 men at work nearly all winter, and expect to employ 100 to 150 next year."

The company owns a very large body of ground on both rivers, and have expended upward of $100,000 in improvement and development this season. The gold is unusually coarse, although there is considerable flour gold, most of which they have fortunately devised a means to save.

There is a great deal of rich ground yet unclaimed on the Salmon river. It takes money and energy to work such properties, but all real mining men who have inspected that country agree that fortunes are waiting there for men of means and courage.

IDAHO.

The Granite Mine.—Wardner *News*: The Granite mine, on Nine Mile gulch, under the management of John Porteus, has 50 men on its payroll. Two shifts are employed at the mine and a day shift at the mill. John Thomas is foreman and J. P. Keane is shift boss, assayer and surveyor. The concentrates are shipped to the Kansas City Smelting and Refining Company.

OREGON.

A Bonanza Cleanup.—Baker City *Democrat*, Nov. 6: The Bonanza mine at Robinsonville again sends in a neat cleanup of the precious metal after a short mill run. Late Sunday evening Supt. Al Geiser arrived in this city with bullion amounting to $2000, which he deposited yesterday morning at the First National Bank.

Mill Bought.—Baker City *Democrat*, Nov. 6: The negotiations pending for several days between Mr. O. B. Hardy, one of the lessees of the Phœnix mine at Robinsonville, and Mr. P. Basche, of Besche & Company of this city, for the purchase of the five-stamp mill on the Evening Star mine at Gimletville, have been closed and Mr. Hardy and associates have purchased the plant.

Mr. Hardy has let the contract for the moving of the plant to the Phœnix to Messrs. McEwen & Daly, the stage men at McEwen, and they will get their teams ready for its transportation at once and before the snow of winter sets in.

WASHINGTON.

Copper Ore Found.—Seattle *Press-Times*, Oct. 26: A number of mining men congregated at the mineral palace this morning to inspect 1200 pounds of copper ore which was being placed in the palace on exhibition. The ore comes from Trout Creek mines, eight miles from Index, on the Great Northern railroad, and was brought in by Colonel B. Townsend and Mr. A. Merchant. Mr. A. Thurston Hayden, the assayer, came in with them. He says:

"On Trout creek we have located 26 copper claims. Of these two are developed claims and the rest are prospects. The two principal leads, called the Blewitt and the Copper leads, are thought to be very valuable. The Blewitt lead is exposed for 110 feet, with an average width of 15 feet. It is a double-gang lead, consisting of quartz and talc. The quartz portion assays 15 to 25 per cent copper and 3 to 7 per cent silver.

"The Copper lead shows up 36 feet exposure and 6 feet in width, with an average assay of 29 per cent copper and a little silver.

"The ore is of a permanent character. It is called the chalco-pyrite, which is the copper ore of commerce as found in Eastern States."

A party of five miners have been at work on these leads since the 1st of March and have not been compelled to close operations on account of the snow.

Market Reports.

The Markets.

SAN FRANCISCO, Nov. 16, 1893.

Silver has been a little weaker during the week, and has declined both at home and abroad. The decline can be ascribed to no new influence, but is due to the general operation of causes which have long been bearing the silver market. It is probable that at the opening of Congress in December the matter of remedial legislation will be taken up and no doubt brought to some definite conclusion.

Coins of 1893.

The face value of the coins made at the United States Mints in October and for the first ten months of the calendar year will be found annexed:

	For October.	Jan. 1 to Oct. 31.
Double Eagles	$1,365,000	$15,938 880
Eagles	5 618,200	13.833.490
Half Eagles	2,576 600	6,646,575
Quarter Eagles	.....	75.157
Standard Dollars	.....	1,455,565
Half Dollars,	220,000	1,752.783
Half (Columb'n) Dols.	.....	2,020 052
Quarter Dollars	97.000	2,078,575
Quarter (Col.) Dols	.....	10,006
Dimes	100.030	631,056
Five Cents	40.000	546,878
Cents	40,100	377.516
Totals	$10.003.900	$45.372,533
In 1892	3.466,400	41,412.795

Only sample lots of standard dollars have been coined since July 1st. There has been an increase of about $8,000,000 in eagles and $1,000,000 in half eagles over the same time last year, and a decrease of $3,500,000 in standard dollars.

Copper.

A large sale of Copper is reported to have taken place in Boston on the 1st. The transaction is given at 1,000,000 lbs. for January and forward delivery, the price being 10c—an advance of ¼c on rates prevailing at the time of sale. There is a fairly firm tone in the market, and prices have an upward tendency. Eastern holders of Copper are confident that manufacturers will soon be compelled to buy, and therefore hold firmly for their own prices which they expect to be paid. Exporters, on the other hand, are not willing to improve their bids, but electrolytic Copper in particular has been sold at rather low prices. Rumors of a combination of foreign bankers and American producers seem to have no substantial basis.

Trade in Quicksilver.

The receipts of quicksilver at this port during October and for the first ten months of the present year compare with the preceding year as follows:

	For Oct.	Jan. 1 to Oct. 31.
1891, flasks	1,781	12,392
1892	2,170	17,148
1893	2,718	20,024

Exports by sea from San Francisco during last month were 583 flasks, including 286 to Mexico, 100 to Central America, 200 to Australia and 2 to British Columbia. Exports by sea for the first ten months of the year were as follows:

	Flasks.	Value.
Ten Months	11,825	$481,215
In 1892	6,748	279,830

Lead.

The lead market is being persistently beared, and prices continue very low.

Silver and the Metals.

NEW YORK, Nov. 16.—Following are the closing prices for the week:

	Silver in— London.	N. Y.	Copper.	Lead.	Tin.	
Thursday	32⅜	70¼	....	....	20	60
Friday	32½	70	9 75	3 20	20	50
Saturday	32¼	69¾	....	3 20	20	50
Monday	32¼	69½	9 85	3 22½	20	37½
Tuesday	32½	69¾	9 75	3 20	20	50
Wednesday	32	69	9.75	3 20	20	50

San Francisco Metal and Coal Market.

ANTIMONY.
Per lb — @ 13

BORAX.
Refined, in car lots — @ 7½
Powdered, do — @ 7½
Concentrat'd, do — @ 8½
All grades jobbing at advance.

COPPER.
Bolt 23 @ —
Sheathing 23 @ —
Ingot, jobbing — @ 20
Do, wholesale 15 @ 18

IRON.
Bar, base — @ 2½
Norway, base — @ 4½

PIG IRON.
8pot.
Eglinton ⅌ ton — @ —
Glengarnock 27 00 @ —
Am. Soft, No. 1 25 00@ —
Bhotta No 1 27 00@ —
Puget Sound — @ —
Clay Lane White 30 00@ —
Langloan 27 00@ —
Gartsherrie 27 00@ —
Barrow — @ —
Cargofleet — @ —

LEAD.
Pig — @ 4½
Bar — @ 6
Sheet — @ 5
Pipe — @ 6½

SHOT.
Drop, sizes *smaller* than B, ⅌ bag of 25 lbs 31 75
Do do, B and *larger* sizes ⅌ bag of 25 lbs 2 00
Buck, Balls and Chilled do, ⅌ bag of 25 lbs 2 00

QUICKSILVER.
Home trade, per flask 40 50 @41 00

STEEL.
English, lb — @ 18
Canton tool — @ 8½
B'k Diam'd tool 8½@ 15
Pick & Hammer 6¾@ 10
Machinery 4 @ 5
Toe Calk — @ 4½

PIG TIN.
Spot ⅌ lb 21½@ 22

COAL.
SPOT FROM YARD—PER TON.
Wellington $8 00
Greta 7 50
Nanaimo 8 50
Gilman 6 00
Seattle 8 50
Coos Bay 5 50
Cannel 9 00
Egg, hard 12 00
Wallsend 7 25
Scotch Splint 8 00
Brymho 7 50
West Hartley 7 50

TO LOAD—PER TON.
Australian 5 50@ —
Liverpool Steam 8 87@ —
Scotch Splint 7 00@ —
Cardiff 7 00@ —
Lehigh Lump 10 00@ —

COKE.
Cumberland 8 50@ —
Egg, hard 8 00@ —
West Hartley 7 50@ —
English, to load $9 50@10 00
Do, spot, in hulk — @12 00
Do, to sacks — @14 00
Cumberland 8 50@ —

Mining Share Market.

SAN FRANCISCO, Nov. 16, 1893.

The past week has been a most active one in the Comstock market. The boom culminated last Friday, Nov. 10th, when the excitement was great. The largest record for several years on the San Francisco Board was made at the regular session Saturday morning, when a total of 51,578 shares were sold in 35 mines, including 16,000 shares Lady Washington at 5c, 2500 Alta, 1500 Andes, 1050 Belcher, 2495 California, 1900 Exchequer, 1400 Curry, 1950 Kentuck, 1500 Overman, 1100 Nevada, 1150 Segregated Belcher, 1100 St. Louis, 1050 Union, and 3350 Jacket. Sales for the week were as follows:

November 6, shares	37,865
November 7, shares	35.530
November 8, shares	23,895
November 9, shares	48,800
November 10, shares	54,535
November 11, shares	51,575
Total shares	252,200
Previous week	102,090

During the present week prices have receded, though there has still been great activity.

The following are the assets and liabilities of the Nevada mining companies on November 1st, as shown by the monthly statements filed according to law:

COMSTOCK MINES.

	Assets.	Liabilities.
Andes	$6,128 41	
Alta	344 59	
Alpha	4.495 54	
Best & Belcher	2,911 23	
Chollar	673 51	
Crown Point	9,128 21	
Con. Cal. & Va	60,887 39	
Caledonia	8,331 02	
Confidence	1,827 88	
Exchequer	792 78	
Gould & Curry	1,581 91	
Hale & Norcross	7,181 60	
Lady Washington	66 81	
Mexican	13,508 12	
New York	1.396 31	
Ophir	12,472 94	
Occidental	236 82	
Overman	1,087 86*	
Seg. Belcher	2,414 81	
Sierra Nevada	15,977 62	
Silver Hill	285 02	
Savage	4.007 34	
Union Con	4,267 23	
Utah	446 85	
Potosi		3,640 79
Kentuck		3,475 55
Belcher	2,938 26	
Challenge	199 74	
Con. Imperial	1,297 33	
Julia	295 60	
Scorpion	710 02	

ADMIE MINES.

Bulwer		2,794 17
Standard	29,124 87	
Syndicate	1,280 96	

TUSCARORA MINES.

Belle Isle		$2,802 58
Navajo		1,840 78
North Belle Isle		2,969 47
North Commonwealth		63 79

*In debt $3,500.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, November 18, 1893.

9:30 A. M. SESSION.

1000 Alta	15c	100 Kentuck	20c
100 Andes	55c	930	15c
300 Belcher	75c	850 Mexican	1.00
750 B & B	2.25	100	90c
400	2 20	800 Ophir	1.70
400 Bullion	40c	50	1.75
100 Caledonia	1fc	20	1 80
300 Challenge	60c	1600 Savage	80c
100	85c	100 Overman	30c
550 Chollar	70c	400	35c
100	85c	700 Potosi	75c
400 Con. Cal. & Va	3 75	400	80c
875	3.65	100 Scorpion	10c
1000	3.70	350 Sierra Nevada	1.10
60 Confidence	1.60	400	1.15
300 C Imperial	5c	300 Seg Belcher	1fc
900 Crown Point	70c	500 Silver Hill	6c
50	55c	300 Union	95c
800 O & C	1.10	100 Utah	15c
250	1.15	100 Yellow Jacket	1.00
150 H & N	75c	200	95c
900 Julia	5c		

2:30 P. M. SESSION.

100 Alta	15c	200 Exchequer	10c
400 Andes	60c	700 Gould & Curry	1.20
400 Belcher	80c	100	1.25
100 Beston	75c	700 H & N	80c
350 Best & Belcher	2.60	50	70c
700	2 55	500 Julia	5c
400 Bullion	50c	300 Kentuck	20c
450	45c	30	15c
600 Caledonia	1fc	500 Mexican	1.20
200 Challenge	70c	100 Ophir	1.85
250	75c	400 Overman	35c
100 Chollar	75c	100 Potosi	90c
20 Con. Cal. & Va	3.90	100 Savage	85c
550	3.85	100 S Nev	1.30
130	3.80	450 Union	95c
100 Confidence	1.76	350 Y Jacket	1.05
200 Crown Point	80c	800	1.00
300 Crown Imp't	1c		

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CENTRIFUGAL LIQUID SEPARATOR.—Arthur F. L. Bell, of San Francisco, Cal., assignor to the California Petroleum and Asphalt Company of same place. No. 508,270. Dated Nov. 7, 1893. The particular purpose for which this machine is intended is for operation upon materials containing sand, silt or other foreign substances, as for example, in the process of separation of water from mineral oils, mineral pitch, liquid asphaltum and other kindred substances. The object is to dispose of the dirt, sand and other foreign substances during and together with the separation of the heavier components of the material under treatment, the discharge being continuously effected. The machine consists of a rotating bowl having inclined walls and discharge holes in the line or plane of its greatest diameter. Within the bowl are guide plates to direct the heavier material to the peripheral discharge holes, and suitable division plates to direct the lighter materials to their discharge from the top of the bowl.

BOILAA ATTACHMANT.—Frank X. Fischer, of Oakland, Cal. No. 508,007. Dated Nov. 7, 1893. This invention relates to that type of boiler which is supported upon vertical water legs. The improvement consists in forming the water leg of separated sheets, and an end-bar riveted between them, and having at points between the rivets hand holes on each side of which are screws passing into the bar. Over these handholes are cover plates secured to the face of the bar. The object of this construction is to provide a hand hole which will make a tight joint and be of such a character that as many of them may be provided as necessary to keep the water legs thoroughly clean.

FASTENAE FOR THA MARTING RAILS OF SASHAS. Fredsrick C. Immel, of San Francisco, Cal. No. 508,389. Dated Nov. 7, 1893. The object of this invention is to provide a simple and effective sash-fastener adapted to automatically lock the sash in such a manner that it cannot be released from without, but can be easily disengaged from within. It consists of a spring-controlled bevel-headed latch seated in the meeting rail of the lower sash and having a notch in one side of its head, a recessed keeper plate seated in the meeting rail of the upper sash and having a side flange with which the side notch of the latch head is adapted to engage, and a means connected with the latch for pulling it sidewise to disengage its notch from the flanges, and thence backwardly to disengage the head from the recessed keeper plate.

LATCH AND LOCK.—John E. Armstrong, of Santa Cruz, Cal. No. 508,627. Dated Nov. 7, 1893. The device is one in which the latch is adapted to be operated by either a rotary or a lineal movement of the knob-spindle. To accomplish the result, the shank of the latch is slotted; with this a swinging lever engages, and a cam on the knob-spindle impinges upon and operates to swing the lever, either by an axial movement of the spindle or by its longitudinal movement. The operating lever is adjustable to adapt its position to various thicknesses of doors. A locking arm readily operated from within is adapted to engage and lock the knob-spindle, and means are provided, operated by a key inserted in a keyway in the outer knob for relieving the locking arm from without.

BUCK RAKE.—Christopher Coulthard, of Emmett, Cal. No. 507,998. Dated Nov. 7, 1893. This invention relates to an improvement in devices for raking hay. It consists of a rake-head having teeth fastened therein, posts suitably braced and extending upwardly behind the rake-head so as to form fulcrum points about which the rake revolves in turning over to discharge its load, and they are so arranged that the rake immediately returns to its proper position as soon as the load is discharged. Swivel connections are fixed to each end of the rake-head, and the teams for drawing the rake are attached at these points. A lever-arm is arranged to be introduced between the upper rear portions of the frame, so that by slightly lifting the frame the points of the teeth will catch in the ground and allow the rake to reverse. The bar slips out of its position the moment the rake starts to turn. Large quantities of hay can be handled in this manner, and the rake slips smoothly over the pile that it has made.

SMALTING FURNACA.—Joseph L. GIROUX, of Jerome, Arizona. No. 508,381. Dated Nov. 7, 1893. This invention consists essentially in the employment of a supplemental blast drum or drums surrounding the bottom or crucible portion of the furnace having passages through which air may be forced directly into the crucible, in addition to the main blast drums which are situated higher up in the usual manner. These supplemental pipes receive air from an air pump or other source which will give considerable pressure, and air is forced through them into the molten material within the crucible. The main blast drums are provided with covers and hinge bolts, which are easily disengaged to allow the covers to be opened without entirely removing the bolts from their attachments. These covers have sliding doors fitted upon them in line with the tuyere openings, and the lower edges of the doors have slots of such shape that the doors will close down and fit around the rod while the latter is being used to clean the opening, and thus prevent any escape of air.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS

ASSESSMENTS.

COMPANY AND LOCATION.	NO.	AMT.	LEVIED, DELINQ'T AND SALE.	SECRETARY.
Alta S M Co, Nevada	44	10c	Nov 10, Jan 4, Jan 28	J E Jacobus, 309 Montgomery
Belcher S M Co, Nevada	47	20c	Nov 3, Dec 7, Dec 28	O L Perkins, Mills Building
Belle Isle M Co, Nev	13	10c	Sept 23, Nov 2, 24	J W Few, 310 Pine
Best & Belcher M Co, Nev	65	25c	Nov 1, Dec 5, Dec 22	Osborn, Nevada Block
Butte Belle G M Co, California	1	80	Oct 11, Nov 15, Dec 8	Chas H Ford, Crocker Building
Challenge Cons M Co, Nevada	16	5c	Oct 10, Nov 14, Dec 5	O L McCoy, Mills Building
Chollar M Co, Nevada	26	10c	Oct 9, Nov 14, Dec 7	Chas E Elliot, 308 Montgomery
Cons New York M Co, Nevada	11	5c	Sept 27, Nov 1, Nov 22	Chas E Elliot, Nevada Block
Cou Wyoming G M Co, Nev	3	5c	Oct 3, Nov 13, Dec 2	W J Garnett, 308 Pine
Crown Point G & S M Co, Nevada	52	10c	Sept 26, Oct 31, Nov 21	James Newland, Mills Building
El Leopoldo G & S M Co, Montco	4	1c	Oct 26, Dec 1, Dec 18	Jabez Howes, 214 Pine
Evening Star M Co, Cal	11	4c	Oct 11, Nov 13, Nov 29	J J Scoville, 320 Sansome
Gould & Curry S M Co, Nev	72	10c	Oct 14, Nov 16, Dec 7	Alfred K Durbrow, Nevada Block
Granite Hill M & D Co	1	12c	Oct 10, Nov 11, Nov 27	J M Will y, Grass Valley
Gray Eagle M Co, Cal	31	5c	Oct 11, Nov 15, Dec 8	Chas O Harvey, 309 Montgomery
Hudson Bay Cons O M Co, Cal	1	10c	Oct 4, Nov 11, Nov 30	J H Sayre, 328 Montgomery
Idaho & Eureka N W Extension M Co, Cal	1	2c	Oct 14, Nov 14, Nov 30	Geo F Nourse, Sacramento
Julia Cons M Co, Nevada	25	5c	Oct 23 Nov 23, Dec 19	J Stadtfeld, 309 Montgomery
Kentuck Cons M Co, Nevada	7	10c	Oct 5 Nov 8, Nov 30	Aug Waterman, 3 9 Montgomery
Martin White M Co, Nevada	29	25c	Aug 31, Oct 26, Dec 14	K L Ross, 120 Sutter
Mt George M Co, Cal	3	1c	Sept 29, Oct 31, Nov 18	J M Thomas, Grass Valley
Occidental Cons M Co, Nevada	14	10c	Oct 9 Nov 13, Dec 4	Alfred K Durbrow, Nevada Block
Overman S M Co, Nevada	68	10c	Nov 10, Dec 14, Jan 4	Geo D E wards, 411 California
Potosi M Co, Nevada	40	25c	Nov 13, Dec 15, Jan 4	Chas E Elliot, 308 Montgomery
South Eureka M Co, Cal	6	1c	Sept 13, Oct 21, Nov 23	Abraham Balsey, 328 Montgomery
St John Quartz M Co	5	5c	Oct 14, Nov 15, Dec 2	J M Wiley, Grass Valley
Teresa Mining Co, Mexico	12	1fc	Oct 27, Dec 7, Dec 23	K J Willats Flood B'ld'g
Union Con S M Co, Nev	48	20c	Oct 3, Nov 8, Nov 29	Chas E Harvey, 309 Montgomery

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE
East Best & Belcher S M Co, Nev	Regular	C H Mason, 324½ Montgomery	Nov 23
Justice M Co, Nevada	Special	R E Kelly, Nevada Block	Nov 24
North Gould & Curry G & S M Co, Nev	Regular	C H Mason, 324½ Montgomery	Nov 20
Occidental Cons M Co Nev	Regular	Alfred K Durbrow, Nevada Block	Nov 20

Assessment Notices.

GOULD AND CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Trustees held on the fourteenth day of October, 1893, an assessment (No. 72) of Ten Cents (10c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the company, Room 69, Nevada Block, 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 16th day of November, 1893, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on THURSDAY, the 7th day of December, 1893, to pay the delinquent assessment, together with the cost of advertising and expenses of sale. By order of the Board of Trustees.

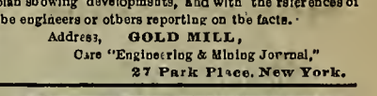
ALFRED K. DUNBROW, Secretary.

Office—Room 69 Nevada Block, No. 309 Montgomery street, San Francisco, California.

To Mine-Owners (Gold) Requiring Machinery and Working Capital:

A company is prepared to furnish a stamp mill of from 80 to 100 stamps, with all accessories, and a limited working capital, for a liberal interest in a gold property that is sufficiently developed to ensure an undoubted supply of payable ore. No property need be offered that will not stand a close and thorough examination and working tests by experienced engineers. Address with full particulars, and if possible, with rough sketch plan showing developments, and with the references of the engineers or others reporting on the facts.

Address, **GOLD MILL,**
Care "Engineering & Mining Journal,"
27 Park Place, New York.



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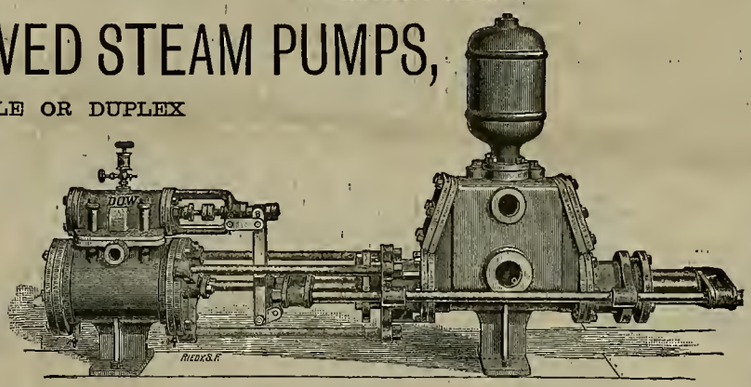

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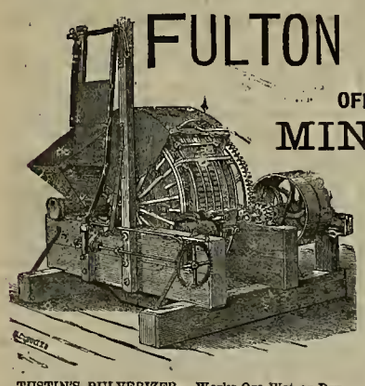

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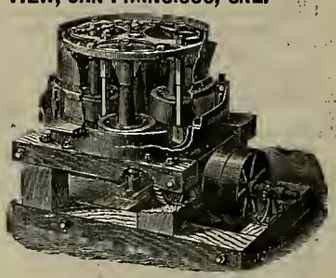

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CALIFORNIA

Not a Political Device.

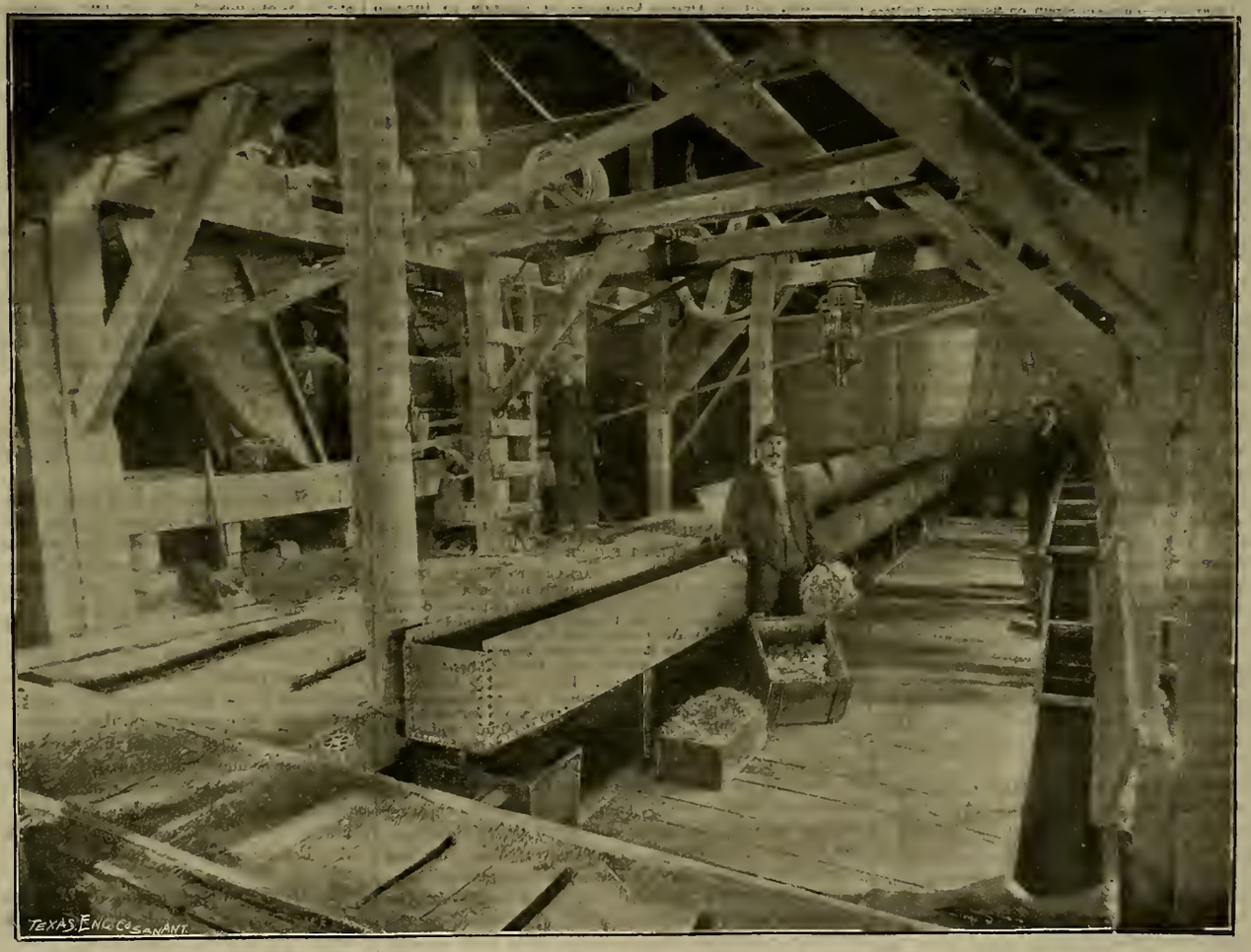
The Shasta *Courier* complains bitterly that the law suspending assessment work on unpatented claims for 1893 is a "bilk and political trick and a vote-catching measure got up by Democratic Congressmen to catch votes in mining States." All miners in that section are said hy the *Courier* to have nearly finished their assessment work, and the law is of little benefit to them. The *Courier* is unaffected; and California miners are not that kind of people, and do not show that kind of spirit.

THE silver fight is to be resumed just as soon as Congress meets. The silver men are making preparation for an active campaign, and Congressman Bland thinks public sentiment has already so changed on the subject that the House will adopt a free coinage hill. Mr. Bland's zeal in behalf of the cause he so ably advocates has doubtless hlinded his judgment, for it is not to he expected that free coinage can so soon be re-established as the policy of the nation. At the same time the silver men are backed up hy a strong sentiment throughout the country that there shall be positive legislation recognizing silver. There are two sufficient reasons why silver should receive favorahle legislative action, and they are: The interests of the country demand that it he placed on an equal hasis with gold as a money metal; and it is the duty of Congress to foster in every practicable way an indnstry of vital importance to many States and Territories.

ADVICES from Washington indicate that the fight over the proposed removal of duty from lead-silver ore will be very hitter, and that it will he conducted on the same lines as in the preceding Congress. Generally speaking the controversy is hetween the silver miners on the one hand and certain of the smelters and manufacturers on the other. The issue is exceedingly doubtful; but the chances at present appear to indicate repeal. The late election is not accepted by the Administration as a rebuke to its tariff-for-revenue policy, and the work of tariff reform will without doubt he attempted on the plan indicated in the Chicago platform.

THE long-standing strike of the English coal-miners has heen settled through the intervention of Premier Gladstone. The men will resume work at the old rate until February, when a Board of Conciliation will be formed. The hoard will consist of 14 coal-miners and 14 coal-mine owners. All collieries are to hegin work, as far as practicahle, immediately, and the men will not be discriminated against in returning to work. The hoard is to have a neutral chairman with a decisive vote, and they also have the power to determine the wages after March. The result is a substantial victory for the strikers.

IT may perhaps clear up a matter of doubt in some minds to state that the suspension of assessment work law just passed hy Congress likewise supersedes the operation of any local law on the subject requiring the performance of $100 lahor on unpatented claims. State and local laws on mining matters can be made not in conflict with federal enactments; and clearly such local laws can not stand hefore the federal act just passed.



THE CYANIDE PROCESS AT THE MERCUR MILL—PRECIPITATING TROUGHS.—*See page 341.*

necessarily harsh. It is true, as it says, that "a mine worth holding is worth doing assessment work on;" but it is also true that the miners in the silver States are in no shape to do any kind of development on properties they hold and intend to work in good faith. Many speculators who have obtained possession of claims will receive the full benefit of the law. But it was manifestly impossible to exclude this class from the operation of the law and, in order that worthy persons might not he injured, it was necessary to include all. It is probable that if there had been any general protest against the law in this State, California would have been exempted with South Dakota. But there was not, and we were included.

Those claimants who have already performed their work on good claims have certainly not wasted their labor. If the law has not henefited them, it has done them no harm. It shows a small spirit to hegrudge your neighhor a henefit you do not receive yourself, when your interest is not

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San Francisco, November 25, 1893.

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Notes of the Midwinter Fair.

The work of preparation of a mineral exhibit at the Midwinter Fair by the Miners' Association Committee has so far progressed that it is certain there will be made the largest and most complete display of the products of California mines ever attempted. The counties, which at first intended to show their mineral resources as part of the county exhibits, are gradually falling into line and will contribute to the general collection. Each county will be given full credit for all it displays, but the management reserves the right to assign position and also to use such parts of each exhibit as it chooses to make up part of a general display of any given product. This decision is necessary to insure a proper distribution of the displays and suitable representation of the various minerals according to their importance and attractiveness. It should be added that no county is prevented from showing its mineral products with its general exhibit, provided it contributes its full share to the State display.

The general exhibit by the Miners' Association will be in charge of Supt. E. H. Benjamin of the Hayes Red Hill mine, Trinity county. Mr. Benjamin is a practical miner, and a business man as well.

The mining machinery men have not made public their plans for the fair, but without doubt they will be adequately represented.

The management has practically made the allotment of near 10,000 square feet of space for the mining exhibit in the eastern center of the Mechanic Arts building. Private exhibits of mining machinery and a big quartz mill in operation will occupy the adjoining space under the gallery. The mineral arch, which formed the most notable and attractive portion of California's mining exhibit at the World's Fair, is now being packed there for transmission to the Midwinter Fair. Here the committee in charge of the mining exhibit will arrange for setting it up and adding to its features to make it even more imposing and complete.

THE building of a cable from San Francisco to Hawaii is again being agitated. The State Department is now said to be favorable, the very inadequate means of communication having been made more than ever manifest on account of the political imbroglio.

AN address to the miners of California by the executive committee of the California Midwinter Fair exhibit will be found on page 349 of this issue. It deserves the careful attention of and a generous response by the mining men of the State.

More Hydraulic Mines To Start.

Official notice of reappointment of the California Debris Commission arrived last Saturday, and Monday the commissioners met to consider a number of applications. License to mine by the hydraulic process was granted to the owners of the Corbiere & Bean mine, near Clipper Mills, on the watershed of the North Ynba. The owners have built a debris dam in accordance with the requirements of the Commission, and the work has been approved.

Authority to construct dams in accordance with plans submitted to the Commission was granted in the following cases: Craycroft mine, Eureka mine and Excelsior mine, near Downieville, which drain into the North Yuba; the New York mine, owned by Westall & Hughes, on Howard creek, Sierra county; and N. C. Tully's Omega mine in Nevada county, which drains into the Middle Yuba. In case the construction of these dams is in accordance with plans, the Commission will issue license to mine.

From the foregoing it will appear that the Monday session of the Board was more important in results than any yet held. One mine is granted permission to resume operations and five others are told that they may start up just as soon as they comply with certain necessary requirements. The conditions have already been considered and accepted by both the commissioners and owners of the mines. Final grant of license will be denied only in case the miners themselves fail to fulfill requirements they have already agreed to.

Two things have become perfectly evident since the Debris Commission began its work, viz.: The hydraulic miners of the State propose to make the most of the Caminetti act, and the Debris Commission intends to furnish them every reasonable and lawful facility to resume. So far, no application to mine has been rejected, though of course it is not at all to be expected that none will be. The number of inquiries addressed to the Commission is large, and indicates a degree of interest in, and practical approval of, the act among miners that was scarcely expected at the time of its passage. It is getting too late in the season for any extensive movement among hydraulic mines which have not already attempted to take advantage of the law; but it may be confidently expected that next year there will be a very great deal of activity.

Meanwhile, those who intend to make application to the Commission should get their plans in shape. Miners in the various districts should, wherever possible, combine and make application at the same time, so that the personal inspection which must be made by the commissioners may not require separate visits for each mine. It is too much to expect that the commissioners will make prompt trips to remote points in all cases. Much delay may be avoided if several mines are inspected at the same time.

The Assessment-Work Bill a Law.

Following is a sample of very many letters daily received by the MINING AND SCIENTIFIC PRESS:

SACRAMENTO, Nov. 20, 1893.

TO THE EDITOR:—Can there be any question about the correctness of the law regarding assessment work on unpatented mineral claims, as published in the PRESS of the 11th and 18th inst. The Denver (Colorado) *News* states that the bill in question did not become a law, and the Reno (Nevada) *Journal* states that the Senate amended the act by excepting from its benefits corporations and non-resident owners. Being largely interested in some silver mines that are unpatented, I am anxious to have the facts, and the officials here are without any positive information on the subject, both at the Land Office and State Library. JOHN A. MCINTYRE.

The matter is of such importance that it is natural for all locators on unpatented claims to desire to make "assurance doubly sure." There is no doubt whatever that the law has been passed and signed by the President, and is now in operation. The Denver *News* does not know what it is talking about. Its statement has been widely circulated and it has done much mischief. The Reno *Journal* is likewise in error. The mistake of the latter doubtless arose through the fact that such amendment was considered, and there was at one time a probability that it would be incorporated in the bill. But it was not.

The MINING AND SCIENTIFIC PRESS received copies of the law both from Senator Perkins, of this State, and from Representative John C. Bell, of Colorado. Congressman Bell was the sponsor for the measure. It was introduced by him at request of the miners of Colorado, who were suffering from hard times and upon whom the full operation of law would have worked a hardship. The bill was approved by President Cleveland November 3, 1893, and took effect from that date.

Accompanying the text of the law sent to this paper by Congressman Bell is the following letter:

HOUSE OF REPRESENTATIVES,
WASHINGTON, D. C., Nov. 10, 1893.

DEAR SIR:—Yours of November 2d received this A. M. As the Mining Assessment bill has now become a law, and was received in the document room printed in law form, I enclose you a copy of that instead of the original bill. JNO. C. BELL.

The text of the enclosed law is precisely the same as heretofore published in the MINING AND SCIENTIFIC PRESS. There ought to be no further doubt about the matter.

Gravel Mining in Plumas and Sierra Counties.

By H. W. Turner of the United States Geological Survey.

As a result of the Caminetti law there promises to be a revival of gravel mining in the Sierra Nevada. Already the Smartsville gravel deposits are being again washed by the hydraulic method, and, it is said, preparations are being made to hydraulic at other points.

During the past season the writer has been engaged, under the authority of the U. S. Geological Survey, in making a geological map of a portion of Plumas and Sierra counties.

All the old river gravel areas, where exposed and of any size, are to be represented on this map, and, where practicable, the gravel channels under the lava ridges will be indicated. In gathering data for this map the writer became aware that very large bodies of auriferous gravel exist in the mountains which have not yet been washed for gold. Much of the gravel is exposed to view, and other channels are covered with lava.

The gravel deposits about Scales and Poverty Hill, in Sierra county, offer a field for extensive hydraulic operations through a series of years; and a large amount of gravel still remains at Laporte, Eureka north, and at other points. Under the lava ridges the amount of gravel is definitely known at only a few localities, and the expense of running tunnels or sinking shafts to find the gravel bodies, as well as the chance of not finding any gravel at all, makes this the most hazardous method of gravel mining, except where the existence and course of the channel has been carefully determined.

Many miners, it would appear, take it for granted that under all the lavas there are gravel channels. This is far from true. It is now ascertained beyond possible doubt that the lavas that cover so many of the Pliocene gravel channels, issued from the earth's interior from openings chiefly along the summit of the range, and only locally at other points. The lavas that came out of these old volcanic vents along the crest of the range flowed down the old valleys, displacing the rivers and covering up their gravels.

Many of the lava-capped ridges of the present Sierra Nevada represent portions of these old river valleys, and the chances of finding gravel under the lava caps are therefore good, but this does not apply to all of the lava areas along the summit of the range, some of which are dikes of hard lava that came out at the point where they now are, and others represent orifices of the volcanoes that poured forth the floods of lava that displaced the Pliocene rivers.

It is obvious that under such lavas gravel areas are not to be looked for, yet a number of cases have come under my observation where miners have run tunnels or sunk shafts into these old volcanic orifices in the vain hope of finding gravel under the lava, which came up from the earth's interior at that precise point.

In many cases, as between Howland Flat and Poker Flat, the gravel channels have been broken up and displaced, and penetrated by dikes of hard lava. The once continuous gravel channel is in this way broken into separate bodies. On account of the volcanic eruptions and the consequent displacements that have taken place, it is probable that much difficulty will be experienced in following the old river channels about Blue Nose, Mt. Fillmore, Rattlesnake Peak, Saddle Back, and other volcanic centers. H. W. TURNER.

San Francisco, Nov. 18, 1893.

THE Giant Powder Company Consolidated has selected the following board of directors: J. N. Knowles, L. P. Drexler, E. B. Pond, Gustav Sutro, L. A. Monteagle, E. B. Root, J. R. Spring. For these gentlemen 18,505 shares were voted. A meeting of the board was subsequently held and the following officers elected: President, E. B. Pond; vice-president, E. B. Root; treasurer, Bank of California; superintendent, Frank Roller.

A MONTANA PAPER proudly makes the statement that "Montana has produced over $400,000,000 in gold, silver, copper and lead, or nearly one-third the entire production of the United States." It is well enough to be accurate. Montana has not produced one-third the entire output. The total figures for gold alone from 1792 to 1892 inclusive are $1,969,692,949, silver $1,158,831,896, or a total for these two metals of $2,120,524,845.

PLUMAS COUNTY seems to have "knocked the persimmon" at the World's Fair, so far as the California mineral exhibit is concerned. The exhibit of that county was awarded a medal and diploma for "a collective exhibit of gold, silver, copper and iron ores."

Profits of Gold Mining.

By W. S. Chapman.

It has been frequently said that mining is gambling; that mining has all the elements of gambling. To this I demur. I contend that mining is not gambling; that it has more of the elements of safety and certainty than almost any other kind of business; that it is very much in favor of mining that there is no competition, and can be none, in that business, while in all other business relations competition cuts a very important part.

What constitutes the uncertainty in mining is that it is largely conducted by men without experience, and men who have never succeeded in any other business. Bring to bear on mining the same experience, the same business qualifications, the same careful and constant attention that must be given to any other business to insure success, and failure will result less frequently than in any other business. As an example of this, I refer to statistical facts, which show that not more than four per cent of merchants succeed through life. In other words, 96 per cent of those who engage in the various mercantile pursuits fail at some stage of their careers. I think that that is a greater percentage of failures than can be shown in the mining business.

Another great advantage in mining is that every dollar produced is a new dollar that never was in existence before. When a merchant makes a dollar, that dollar has only changed hands; there are no more dollars in existence than there were before.

I believe that the disastrous condition of financial affairs in this country now is mainly due to a lack of enterprise in the development of the gold mines. In proof of this proposition, I will refer to the condition of gold and silver mining in 1860. In that year there was only $150,000 of silver produced in the United States, while in the same year the gold product of the United States was $46,000,000. The following year (1861) there was $2,000,000 of silver produced and the gold product fell off $3,000,000. In 1865 there was $53,250,000 of gold and $11,250,000 of silver. In 1870 there was $50,000,000 of gold and $16,000,000 of silver. In 1880 there was $36,000,000 of gold and $39,000,000 of silver. At that time the production of silver, as will be seen, exceeded that of gold. In 1885 there was $31,800,000 of gold and $51,600,000 of silver. In 1891 the product of gold was $33,000,000 and of silver nearly $75,500,000. This shows a very great change in the product of the two metals, gold falling off from $46,000,000 in 1860 to $33,000,000 in 1891, while silver, which in 1860 amounted only to $150,000, rose in 1891 to $75,500,000. This shows a very great disproportion in the production of the two metals, and was in itself a prime cause of alarm among that class of people now known as "gold bugs."

Had our people continued gold-mining, so as to keep the production of gold and silver somewhere near an equal basis, the alarm which resulted in the great conspiracy which demonetized silver would probably never have occurred. And I believe now that the only wise thing for gold-producing countries to do is to encourage and foster the development of gold mines by every reasonable means. I believe that gold-mining ought to be encouraged by every business man on the coast. It ought to be taught in the schools. It ought to be encouraged as a legitimate business, and not as a gambling one.

California now produces about $12,000,000 to $13,000,000 of gold per annum. It is safe to say that that $13,000,000 turns once a day. If that be so, the benefit derived from the use of that amount of money in a year would be simply enormous. The product of the California mines could be easily raised to $20,000,000 or $25,000,000 per annum. Gold mines, both in placer and quartz, exist almost without limit in the mountains of this State. It has been said by a very prominent editor of San Francisco that he would not be surprised that the amount of gold yet in the mountains is equal to what has already been extracted therefrom; while, as a matter of fact, all the gold taken out is but as a drop in the ocean compared to the amount yet remaining in the Sierra Nevada mountains.

It is safe to say that the gold mines of this State have scarcely been prospected. And, with all our improvements and facilities for working gold quartz, our well-known methods of saving sulphurets, and saving, practically, all that there is in the quartz, mines that a few years ago would not have paid running expenses are rendered very profitable.

If gold-mining were fostered and encouraged, and not criticised as a gambling enterprise on the Pacific coast, scarcely a year would have passed before we would have an abundance of money. Times would be easy. We would be putting $25,000,000 of gold money into the channels of trade every year, the effect of which would be felt not only on the Pacific coast, but all over the world.

I see by a statement in a newspaper of this city that Armour & Co., of Chicago, a while ago purchased $500,000 of gold in Europe, for immediate importation, and that the company contemplates further purchases; and the move is said to be in the interest of relieving the financial stringency. Now, if Armour & Co. had developed a gold mine like the Kennedy mine, for instance, which would have produced more than $1,000,000 in 12 months, that would be adding just so much new money to the circulating medium of this country, while purchases in England to bring to this country add not a single dollar to the fund. In one case, the good that would be derived would be beyond computation, while in the other it is simply a case of money changing hands, which is of very temporary utility.

W. S. CHAPMAN.

San Francisco, November 20, 1893.

Foundry Notes.

A HUNTINGTON ROLLER MILL has been put up on the Reed Bros.' mines, five miles west of Perris, Riverside county.

THE McGlew Ore Concentrator Company has just shipped two concentrators to Nevada county for the German Mining and Milling Company. They will be used in a ten-stamp mill. There have been shipped this week also one McGlew concentrator to the Bancroft Mining Company, Mariposa county, for an 8-stamp mill and one concentrator to the Gem mine in Shasta county. An order has just been placed by a Mexican company for ten concentrators, to be completed as early as possible. Thomas McGlew, president of the company, is about to leave for Mariposa county on business.

Two Woodbury concentrators have just been shipped to Butte county for the 10-stamp mill of the late D. K. Perkins. Two have lately been shipped to Prescott, Arizona. Four have just been furnished the Union Iron Works on another order. Negotiations are about to be closed for the installation of a number of concentrators in a Utah mill, and a Montana mill is likewise about to equip itself with Woodbury concentrators. Mr. Woodbury may go to Utah to superintend placing in position the concentrators. He reports that there is much improvement in business and an increasing demand for concentrators.

THE schooner Nora Harkins sailed last week for Ecuador, loaded down to the gunwale with a part of the hydraulic equipment of the Playa de Oro Mining Company, furnished by Francis Smith & Co. The same schooner last spring carried away the first half of the outfit, which consists of 11,250 feet of 22-inch pipe, 14,220 feet of 36-inch, Nos. 7, 8, 9, 10, 11. There are two No. 6 giants, two No. 8. There are besides pipe tools, water gates, complete equipment for pipe shop, and 140 barrels of asphaltum. The work of placing the hydraulic plant in position at the Playa de Oro fields has been going on for some time, 8000 feet of pipe being made up.

Book Reviews.

A TEXT BOOK OF COAL MINING:—By Herbert W. Hughes. With numerous illustrations; published by J. B. Lippincott & Co., Philadelphia. For sale by Osborn & Alexander, San Francisco; price $6, free of transportation charges.

It is the aim of the author of this work to supply in a book of moderate dimensions, information with which the student and practical miner should be familiar. The various branches of coal mining, from search for coal and preliminary operations to the preparation of the product for market are consecutively and intelligently treated. Much attention is paid to the general detail of colliery work, on the ground that collieries are more often made remunerative by perfection in small matters than by bold strokes of engineering. Numerous references to authorities from whom fuller information on particular subjects may be sought are made at the end of each chapter—a feature that will be found valuable and instructive. The work on the whole seems to have been prepared with much care, and to be a valuable contribution to literature on the subject.

ELEVENTH REPORT OF STATE MINERALOGIST (First Biennial):—By Wm. Irelan, Jr., State Mineralogist. Published by State Printer.

The issuance of the State Mineralogist's report for the two years ending September 15, 1892, has been delayed until this time because of a determination on the part of the authorities that its contents should be abridged. The report of Mr. Irelan, as originally submitted, was quite voluminous, and contained many papers on a variety of subjects by scientists well known in the State. These included essays on fossils, aboriginal shell money, on Santa Rosa island, on San Miguel island, etc. The work of condensation was entrusted by the State Board of Examiners to Mr. Charles G. Yale. It has been the effort of the editor to eliminate such matter as was not directly related to the mining interest; and, besides, several papers on mining, which were a practical reproduction of papers already published, were omitted. Reports of assistants in the field were condensed. Some idea of the extent of the condensation may be gleaned when it is stated that in the original manuscript there were 2307 pages, largely type-written. This was reduced to about 844 pages. The total paging of the printed report is 612. The chief features of the report as printed are papers on the "Geology and Mineralogy of Shasta County;" "Geology and Mineralogy of Portions of Tehama, Colusa, Lake and Napa Counties;" "Geology of San Diego County; also of Portions of Orange and San Bernardino Counties," all by Harold W. Fairbanks, F. G. S. A.; "Hydraulic Ejectors," by E. A. Wiltsee, M. E.; "A Dissertation Upon the Origin, Development and Establishment of American Mining Law," by A. H. Ricketts of the San Francisco Bar; and reports from the various counties.

THE following complimentary notice of C. H. Aaron's work on "Assaying" is contained in the New York *Engineering and Mining Journal* of November 11th:

These little books, now in the second edition, are intended to be a guide for those who have not the requisite knowledge of chemistry to take up the more thorough and comprehensive text-books like those of Kerl, Beringer, Brown, Mitchell and others. Mr. Aaron the author, is a practical metallurgist of long experience, who knew exactly what was needed in the kind of a book he set out to write, and accomplished his purpose well. The first part of the book treats of the assay of gold and silver ores; the second part takes up the assay of gold and silver bullion, while in the third part methods for the detection and determination of copper, tin, bismuth, antimony and other metals are more or less fully described. There are many practical hints of value in these little books, which every assayer may read with profit.

Slickens.

THE *Mining New Era* has been established at Forbestowo, Butte county.

GOLD FINDS are reported from the Organ mountains, 50 miles northwest of El Paso, Texas.

FOUR men in the Cedar river (Mont.) placers cleaned up $16,000, the result of the season's work.

THE Humboldt Oil Company, on the South Fork of Eel river, Brueland, Humboldt county, is about to renew operations.

ANDY RODGER, of Alta, has purchased the Golden Eagle drift mine, situated at Shady Run, in eastern Placer county, from Henry Dresler for $10,000.

THE Utica Mining Company, by Alvinza Hayward, president, has subscribed $2000 to the Midwinter Fair. The Utica is one of the best-paying mining properties in California.

THE machinery of the Champion mine, at Nevada City, was started up November 18th. There were speeches by various notables and a fine lunch. The ponderous machinery worked like a charm.

SURVAYOR-GENAAL ROBINSON of Colorado has increased the fee for surveying a mining claim from $25 to $30. This was done because the expenses of the office have been greater than the receipts of late.

A PORTLAND (Or.) syndicate proposes to make a tunnel at Ruby, Wash., 2200 feet long, which will tap the leads at a depth of 2000 feet and by crosscutting will give an outlet to seven valuable properties.

THE Brown Bear Mining Company of Deadwood, Trinity county, has adopted the rule that any employe found drinking liquor or gambling will be summarily discharged, says the Weaverville *Journal*.

THE Bimetallic and Elgin smelters, at Leadville, Col., are now running full time, and other properties recently in operation have not been affected by the repeal law. It is a matter of congratulation in Colorado that silver has not declined more than it did, following passage of the Act.

THE National Nickel Company, whose mine is located 40 miles southeast of Lovelocks, in Churchill county, Nev., is about to commence the construction of big works at that point for reducing nickel ore found in that district.

MESSRS. DUCHOW, DAAKE & Co. have formed the Tuolumne Mining Bureau and Agency, with headquarters at Sonora, Tuolumne county. It will be the business of the bureau to handle mining properties. Agencies will be established in the principal cities of the United States and Europe.

THE Ibex Mining and Milling Company has been incorporated. Principal place of business, Los Angeles. Capital stock, $100,000, with T. B. Burnett, F. B. Henderson, A. P. Maginnis, J. F. Burns, A. Carter, L. A. Grant, J. E. McNeil, G. Holterhoff, Jr., and Charles A. Marriener of Los Angeles as directors.

THE county commissioners of Spokane, Wash., made an appropriation of $2000 for the Spokane exhibit at the Midwinter Fair. The money was given upon one of the strongest petitions ever laid before the board. The action meets with very general approval. The chief feature of the exhibit will be mineral.

A COMPANY has been formed at Forbestown to work the Bullion mine, the property of S. K. Reasoner. The officers of the company are: Frank Willet, president; Jesse T. Clemens, treasurer; Chas. Bouvier, secretary; John Pellar, foreman; John Crossman, W. Kendall, Wm. Smitheram and Thos. Stocker, directors.

THE Idaho Consolidated Mining Company has been incorporated by Robert McMurray, A. E. Head, A. C. Hamilton and W. H. Martin of this city and John W. Greenbank of Alleghany, Cal. The subscribed capital stock is $10,000,000. Mr. McMurray holds $9,800,000 of the stock and the others hold $50,000 each.

A CURRENT newspaper paragraph says: Over 100 professors and mining engineers and experts have been sent by the Prussian Government into this country to study the mining, manufacturing, transportation and other industries. About 50 of them in one party expect to visit Nevada county during the month of December.

THE new water-jacket smelter at the Reno Reduction Works has been fired up. Everything worked well. All the machinery at the works is run by water power. The smelter is from 35 to 45 tons capacity, and is of the most approved make. There are on hand about 5000 tons of material containing gold, silver, lead and other metals to be smelted, also immense piles of coke and limestone, the latter being used for flux. It will soon be determined whether the smelter is a success.

THE feeling that lead has reached bedrock and can go but little lower anyhow has much to do with the feeling of confidence that is still present in the Coeur d'Alene, says the Spokane *Review*. None of the mines would work under any considerable reduction from the present quotations, but a material raise will within a short time double the working force at least. On the other hand, a failure to realize better prices, it is feared, will result in serious curtailment of the present working force.

A CORRESPONDENT, referring to the law suspending assessment work for the present year, wants to know if a co-owner who has already performed his share of work cannot compel his co-owner or co-owners to reimburse him pro rata. Probably not. The law exempts all owners from any obligation to perform work, and if it has already been partly performed by one partner, he will, we think, find some difficulty in enforcing a legal claim against his partners. However, it is a question which the courts might decide differently.

UP to the present time there have been put to work at Aspen, Col., under the new scale of wages some 500 miners, so that the total number of men now on the pay-rolls of the eight to ten big companies is not far below 1000. There is considerable talk of the Argentum Juniata resuming operations in order to do a large amount of dead work at the reduced cost of mining. This property and the Deep Mining Company have been at war for a considerable time. The resumption of operations would mean the employment of at least 200 men.

IT has finally been decided to use petroleum prepared for the purpose as fuel in all the big furnaces that are to be used for heating the buildings at the Midwinter Fair, and for the gen

eration of power, and the furnaces will shortly be erected for that purpose. In this the management is following the example set at Chicago, where it was found absolutely necessary to obtain a smokeless fuel in order that soot might not deface and spoil the white beauty of the buildings. The oil will be run right to the ground in tank-cars and piped thence to the reservoirs, from which it will be drawn to the furnaces; and, as it is produced in California and is much cheaper than coal, the saving will be a material one to the fair management. The oil has not been contracted for yet, but will probably be drawn from the wells about Santa Paula.

TIPTOP, ARIZ., heretofore a prosperous mining camp, has been abandoned. It was a chloride camp, and yielded $50,000 to $100,000 yearly. A company was organized last spring to work properties in the district on a large scale, but gave up the enterprise two or three months since on account of the low price of silver, and the camp has been totally abandoned. Where six months ago was a prosperous little village with a school, store and the hum of industry, to-day nothing is left but two lonely individuals who remain to look after the property.

THE estimates of railroad agents in regard to the number of visitors to be expected at the Midwinter Fair vary considerably. At the S. P. headquarters there is a general feeling that there will be at least 250,000 strangers in the city for a great portion of the time. On Montgomery street, and that part of Market street devoted to railway ticket offices, there are some so enthusiastic as to place the guess at 500,000. Others still more generous in their speculative figure go to the top notch of 1,000,000, though they all confess that they do not expect so great a crowd all at once.

Mines of Eastern Placer.

TO THE EDITOR:—A recent trip among the mines of eastern Placer gives evidence of greater activity in quartz and gravel properties than has been shown for years. There are numerous quartz mines at present being operated with profit, while almost innumerable ledges exist, many of which were worked, in a measure successfully, by the crude methods of early times, and which now only await capital and the improved methods of working quartz. In eastern Placer, however, gravel mining will continue to be the leading industry.

When compared to the vast quantity of gravel workable by the drifting process, which lies in the lava-capped ancient river channels of the Forest Hill and Iowa Hill divides, such valuable drift-mining properties as the Gray Eagle, Mayflower, Breece & Wheeler, Hidden Treasure, Mountain Gate and Red Point mines only amount to a fair prospect of the channels, and it is only then that some idea can be formed of the magnitude of operations which may be carried on in this district in the future.

Following is a mention of some of the properties in eastern Placer:

The Mayflower gravel mine, near Forest Hill, has a regular working force of one hundred men, and I understand the number will soon be increased. About seventy cars of cement gravel is the daily product of the mine and the twenty-stamp mill is running at its full capacity.

The Dardanelles mine, at Forest Hill, owned by Gen. Jo. Hamilton, of Auburn, is at present working but ten men. The channel had been lost for some time, but on November 1st some very rich gravel was found and the present prospects are very flattering. Their ten-stamp mill is now running twelve hours per day. The Dardanelles is the only mine on the Forest Hill divide that is equipped with an electric plant. The mine is lighted and the drills, pumps and hoisting works are run by electricity. The use and application of electric power has been a thorough success in the mine.

The old Paragon mine, now known as the Breece & Wheeler, at Bath, two miles above Forest Hill, is still being worked with profit. The superintendent is working thirty-five men, and the ten-stamp mill crushes gravel twelve hours per day.

Among drift gravel mines the Hidden Treasure mine, located at Sunny South, takes the lead. It is operated on the most extensive scale of any drift-mining property in the State. A total of 160 men are employed, and on the day your correspondent visited the mine 570 carloads of gravel were taken to the dump. The gravel is of low grade, but it is free-washing and the upper sluice boxes are cleaned up daily. As an example of the amount of work accomplished in this mine, 74,000 pieces of heavy timbers, independent of logging, are piled near the main tunnel and they are expected to last only until the first of next June.

The Dam drift gravel mine, three miles above Sunny South, is working a small force of men with very fair success.

A visit to the old and well-known mining town of Michigan Bluff showed quite a revival of interest in properties in that locality. Mining litigation, which is the curse of every camp, has tied up some of the best properties, as well as much territory that has not been thoroughly prospected. Following is a mention of some of the claims at or near Michigan Bluff:

The Ontario quartz mine, owned by E. Polifka, Wm. Stuart and C. A. Knopfel, shows a fine ledge. No work is being done at this mine at present.

The Daniel Webster quartz mine has a well-defined vein that can be traced for miles. The ore was worked in early days by the arrastra process, but a mill has never been erected to work the property.

The Manhattan gravel mine, two miles above Michigan Bluff, is being pumped out through the old Weske tunnel preparatory to resuming work upon the property.

The Bowen gravel mine, adjoining the Weske, is working a force of 12 men, and is paying well.

John Mutchler, who owns the Mutchler drift mine, formerly known as the old Franklin, is running a bedrock tunnel.

Several men are engaged putting the Gorman gravel mine in shape to work this winter.

James Tickell, who owns the Bendago drift gravel mine near Sunny South, has just finished running a new prospect tunnel, which has reached the channel. He has breasted some fine gravel, and will be ready for work in the mine next month.

The Central drift mine, near Deadwood, is at present working ten men, and the force will be increased when water becomes more plentiful.

Miners in the neighborhood of Deadwood and Last Chance, to the number of 40 or 50, are operating small drift mines on a small scale with very good success.

The gravel mine at Red Point, owned by the Mines de Lexington Company, is in a prosperous condition. The main tunnel of this mine, as is well known, was driven from a survey made by the well-known civil engineer, Ross E. Browne. The black gravel was reached a few feet above the bed of the tunnel, and the company is working upstream in the channel with excellent success. At present 64 men are employed, who mine an average of 110 cars of free-washing gravel per day. Superintendent Hoffman recently made a trip to San Francisco to purchase a water wheel, which will enable the company to operate the blower by water power instead of steam.

The Eureka mine, owned principally by F. Chappellett, is located on the east side of the divide from the Red Point property. A bedrock tunnel is being driven to tap the channel from the lowest part of the property, to enable them to work upstream.

The New Brazil Company has run a tunnel from Black Canyon into what is known as the Whisky Hill channel. The tunnel was too high, and they have made an air shaft, and will run upstream until they strike the bed of the channel.

The well-known Mountain Gate gravel mine at Damascus is not being operated at present. The owners are negotiating with parties who expect to reopen the mine and work it on a percentage.

D. W. Osborne, owner of the Osborne quartz mine, near Indian Springs, has opened the mine. He has a slope of 200 feet, and the mine is now ready for a mill.

The Page mine is a quartz property just below Last Chance. They have a ten-foot ledge and there are thousands of tons of ore in sight, but it is not of a very high grade. A two-stamp mill is operated for prospecting purposes.

The Sailor Canyon gravel mine, owned by a San Francisco company, will soon be in active operation. A bedrock tunnel has just been finished which taps the channel, and they are now engaged in getting the sluices and dumps ready for work.

The Theodore Winters quartz mine, which was recently sold to Montgomery, the Salvation Army man, is an immense 50-foot ledge of great promise. This mine will be worked exclusively by members of the Salvation Army. They have been engaged all summer grading a wagon road to the property on which to take in their machinery and supplies. The Army go through with their regular drill and devotional exercises each day. The scenery in the canyon is very fine, and the immediate section is replete with grassy flats and beautiful places for homes.

At the Flat Ravine gravel mine, on the south side of Bald Mountain, which is owned by Davidson, Jeurgensen & Co., a 1500-foot tunnel has been run which is too high. They expect to reach a level from which they can work the channel by extending the tunnel about 300 feet up grade. The gravel, which has been prospected by means of a shaft, promises well.

A half-dozen miners work around Bald Mountain at ground sluicing. The section always pays well, especially in the spring when water is plenty.

At Deadwood the property formerly known as the Davis mine, now owned by Frazil & Co., has a force of 12 men at work. The gravel is very rich, but they are obliged to work it on a slope. The mine is drained through the Elkhorn tunnel and cannot work more men on account of the slope.

Five men are now engaged at the Bishop drift gravel mine at Last Chance.

The Caledonia gravel mine at Last Chance, owned by Dixon, McCarty & Co., has paid well in former years, but they struck a lower channel. This has been reached, however, by a new bedrock tunnel. The mine is at present working but four men.

Perhaps the best-paying quartz property in eastern Placer is the Pioneer, or Lynn, mine, near Damascus, owned by James G. Fair and A. E. Davis of San Francisco. The mine is operated under the superintendency of D. J. Sullivan, who is at present working a force of forty-two men.

From thirty-five to forty tons of ore are mined each day. Their lowest working tunnel is 2300 feet above sea level. A twenty-stamp mill, which is in constant operation, is located in the canyon 600 feet below the tunnel. The mine has been a steady dividend-payer for the past twenty-five months.

Adjoining the Pioneer on the north is the Golden Cross quartz mine, owned by Richard Dorer. The mine has fine prospects, but the owner has not sufficient capital to work it.

Next to the Golden Cross is the Southern Cross, the property of Ford & Bentley. Parties from San Francisco contemplate building a wagon road to the mine and putting in a twenty-stamp mill.

The Dorer quartz mine, seven miles southeast of Towles and owned by San Francisco parties, has been leased by Placer county men, who have a ten-stamp mill in operation.

The Central quartz mine, owned by the Dorer Bros., shows good ore, but it is not being worked at present.

The Big Dipper gravel mine at Iowa Hill is at present working forty-six men. Two months ago they put in a new ten-stamp mill and they are now engaged in running a new bedrock tunnel. This mine has been paying dividends for the past two years.

The famous Morning Star mine at Iowa Hill is working its usual force of men. The amount and frequent payment of dividends is a matter of which the public is well acquainted.

IVAN H. PARKER.

Auburn, Cal., Nov. 20, 1893.

Lixiviation of Low Grade Silver Ores.

Extract from description of work at Pumactes Amalgamated Mine, Australia, in *Australian Mining Standard*.

Under the present conditions a 70 per cent extraction of the silver is obtained, the tailings just running about four ounces of silver. Any higher grade of ore treated would give a much better percentage of extration and so bring out a feature of great importance in such ore treatment.

Per ton the costs are as follows:

	s.	d.
Roasting—Material	7	0
" Labor	4	7
Lixiviation—Material	4	0
" Labor	2	0
Initial, final, trucking, handling	1	8
Total cost	19	3

More details I could furnish, but these are sufficient to show the comparative cost of the treatment with one single furnace, and I have no doubt that if two furnaces were in operation the costs of a double running capacity would not or need not be over 40 per cent additional. The present furnace could not well do more, as with any increase in the quantity, the chlorination quickly goes down. The company have plenty of available steam power, and water in the surface dams and in the mine; but, unfortunately, it must be admitted silver at 2s 9d is not too encouraging. The total cost of the present plant erected was £3300. The roasting cylinder cost £300, whilst ten vats were cheaply secured for £150. The mill, though compact, is built on the site of the old works, and to some extent this has not proved a good condition. Elevation, however, so essential, has been provided for; practical extension of the plant can be carried out at any time, and a good dumpage is secured for tailings. When the plant was projected silver was 3s 2d per ounce. The estimates of working were based on that price, and allowed a profit, but with the metal at the present price the profits are about obliterated. There is at the mine surface over two years' run for the plant, if the price of silver improves at all. Every difference of 1d per ounce of silver would make a difference to the company of £16 per ton of sulphides silver sludge.

In the matter of economic ore treatment the foregoing is of more than passing interest, and especially so at the present moment, when silver is low in price and lixiviation in the colonies has not met with much success; but evidences are not wanting of its applicability in many cases, and success is only to be assured when it is dealt with in a practical way. This class of work is so different to ordinary milling; few hands are to be seen, and when once the ore is properly understood and dealt with, the work gives little trouble and runs on in a comparatively insignificant manner.

The Mercur Mining Company's Cyanide Mill.

Louis Janin Jr. contributes an article to the *Engineering and Mining Journal* on the working of the cyanide process at the Mercur mill, Utah. It is of interest wherever the cyanide process has been tried on the Pacific coast, and is reprinted with illustrations:

The Mercur Mining Company's cyanide mill, some details of which are shown in the accompanying illustrations, is not a model plant, but the interest excited by the successful operation of the cyanide process there makes reference to it of more than passing value. The mill was not built for a cyanide plant, nor was the mine originally thought to be gold-bearing. When the Mercur vein was discovered, it was believed, as its name would imply, to be a deposit carrying quicksilver. Indeed it does; but not in sufficient quantity to make the extraction of that metal profitable. Finally the ore was found to contain gold in paying quantities, although finely disseminated in the gangue. Then a pan amalgamation mill was built, as the ore could not be worked by the ordinary process of plate amalgamation. It turned out later that the pan mill could do very little better, saving not over 40 per cent, it is said, the gold being very fine, while some of it existed as a mere coating on magnetic oxide of iron. Then, too, the nature of the gangue, which contained considerable silt, placed difficulties in the way of successful work. After this failure the plant was closed, and the owners began to look around for another process. After listening to the claims of various inventors, a quantity of ore was sent to Denver for experiments with the cyanide process. Here the results were so good that the Mercur people were encouraged to alter their plant to a cyanide mill. That the mill as it stood at the time the photographs were taken was not so convenient in arrangement as it might have been was due to its construction for another process, and really the work that has been done there is highly creditable from a metallurgical and from an economical standpoint when the numerous disadvantages are considered.

In the first place, the crushing is coarser than it should be. The rolls are not adapted for evenness of product. There are two sets to treat the ore which has passed a Dodge breaker, the primary ones being set to one-half inch and the final to one-quarter inch. Over 20 per cent of the final product which is sent to the leaching tanks refuses to pass a one-quarter inch mesh, while the nature of the ore prohibited fine crushing; such a coarse reduction was not advisable. Sizing trommels would have prevented the formation of an excessive quantity of slimes and would have furnished an even product which would have been leached to a much higher percentage than was then possible. The really unprecedented results which were obtained at the Mercur mill from this coarse ore gave rise to an opinion—erroneous, it is needless to say—that fine crushing was not necessary for the cyanide process; that the solution had the happy faculty of penetrating the gangue and carrying off the gold in its outward passage. Several mills were built under this mistaken idea, which have not been so successful as they otherwise might. It is hoped that millmen are now thoroughly disabused of this opinion.

After the ore has passed the rolls, it is carried over the vats in cars and is then discharged. In a properly constructed mill—one built to be worked with the utmost economy—this delivery to the vats would be automatic. Conveyors would take the ore after passing the screens and discharge it into hoppers over the tubs. The tubs themselves are too small. Their dimensions are: Diameter, 12 ft. 8 in. and depth to false bottom, 35 in. This gives a capacity of about 14 tons when the vat is filled to within 6 in. of the top. The diameter of the vats should be increased, but not necessarily the depth, since the capacity for leaching in a given time increases in the direct ratio of the surface areas, while increasing the depth increases the length of time necessary to leach a charge in direct ratio to the increase. Beyond certain limits, increase in either diameter or depth is not practicable, but tanks holding 25 to 50 tons are within the limits of economical and convenient work.

As would be expected from the crudity of the crushing at the Mercur mill, the time of leaching necessary to extract all of the gold that is possible varies greatly. It ranges between 10 and 240 hours. Such wide extremes cannot be due to the nature of the ore alone, but to the differences in mechanical condition. It is claimed, moreover, that the ore is singularly constant in quality and value. The precipitating boxes, which are shown in the illustration, are 40 feet long—one of wood and the other, slightly larger, of iron. Through these boxes the solution from the tanks passes constantly, and is returned to the solution stock tanks, where additions of cyanide are made to bring it up to the proper strength. After the ore in the tanks has been leached sufficiently, the tank is allowed to drain. However, a considerable quantity of solution (about 400 pounds to the ton, or with the 0.25 per cent solution used at the Mercur, about one pound of c. p. potassium cyanide to the ton of ore) remains in the tank. Of course it is imperative that as much of this as possible should be saved. To dislodge this, wash-water is used, either plain water or by a system employed at times weak solution resultant from washing. In the latter case the weak solution is stored in separate tanks, and this arrangement allows washing with a minimum increase or wastage of solution.

The auriferous precipitate at the Mercur is remarkable for its high contents in lime, as it carries 36.7 per cent $CaCO_3$. The ore is highly calcareous, but so great a solubility of limestone in cyanide as this would imply is to be doubted; it is probably due to mechanical causes, finely divided ore being carried in suspension into the precipitating boxes, where it settles. This, of course, would make the precipitate difficult to handle did the company attempt to refine it on the spot, but as it is shipped to smelting works the latter have to contend with this difficulty.

The smelting works pay a very fair price for the gold. They allow $20 an ounce, less express charges of 12 cents

THE CYANIDE PROCESS AT THE MERCUR MILL—THE ORE TANKS.

The gold in the precipitate thus netting $19.88 per ounce Troy.

The extraction at the Mercur has varied. When the mill was first put in operation it was considerably below 70 per cent, but as experience with the process increased the results became more encouraging, until now, I am informed, the average return is between 85 and 90 per cent. The mill has been enlarged recently, and better results are anticipated both as to extraction and cost. The cost during an early period of work is given at $2.40 per ton, divided as follows: Potassium cyanide (1.27 pounds), 66 cents; zinc (0.55 pound per ton), 5 cents; labor (seven shifts per 24 hours, six day and one night), $1.12; supplies, repairs, fuel, freight, 57 cents; total (not inclusive of office expenses, royalty and superintendence), $2.40.

Since this period the expenses have been reduced as the amount of cyanide lost per ton has been diminished, and a larger quantity of ore is reduced with the same amount of labor.

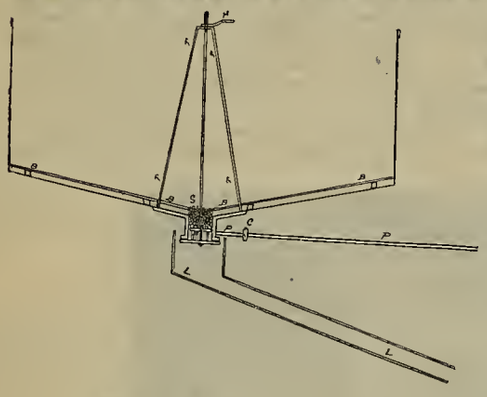
The Mercur mill was the first one in the world to treat ores (as distinct from tailings) with commercial success. It has been a pioneer, and the efforts of its owners and managers should be appreciated. The figures of costs and results undoubtedly could be improved upon on a new plant, but, all things considered, they are highly creditable.

Improved Tanks at the Sultana Mine.

Written for the MINING AND SCIENTIFIC PRESS by Frank Alderman Garbutt.

A brief description of some tanks erected by me at the Sultana mine may be of benefit to such of your readers as are interested in the cyanide process:

These tanks, ten in number, were of steel, coated inside and out with a mixture of asphaltum and coal tar. The covers which were made as tight as possible were of matched pine. The novel feature lay in the manner of discharging the pulp, which was through the center of the bottom, the tanks having a conical bottom to facilitate this



CYANIDE TANK AT SULTANA MILL.

operation. The false bottoms were made of wood, in seven sections for convenience. The closure to the opening in the bottom was operated entirely from above.

The dimensions were as follows: Diameter of tanks, ten feet; depth of tanks at rim, four feet; depth of tanks at center, five feet; diameter of discharge opening, eight inches; fall of bottom, one foot in five. The lixivium was drawn off from the lowest portion.

I am not aware of any tanks similar to the above having previously been used in the cyanide process; in fact, as far as known, the design is novel. I can vouch for the utility of the design, however, as it is the result of a practical development of Mr. Paul's published method of discharging through an opening in the side of tank.

In my first tanks I practiced what I then considered an improvement in the side opening, by locating the discharge in the bottom. On discharging these tanks it was obvious that placing the opening in the center would be a still further improvement. This was found to be the case in the next tanks I had occasion to erect, and it was while operating these that these conical bottoms suggested themselves. Their advantages are ease and quickness of a perfectly clean discharge, increased leaching rate, together with cleaner and more rapid washing.

Frazer & Chalmers in their new number 4 catalogue describe a flat-bottomed wooden tank with a conical-shaped false bottom, discharging through the center of the bottom, which is an improvement on the old method, though lacking some of the features of the conical-bottomed steel tanks, which are as great an improvement over the old tanks as are the porcelain filters over the old wooden box. I believe the porcelain filters, for which credit is due Mr. Paul, to be the greatest mechanical improvement which has been made in the cyanide process, and any one who has had any practical experience in handling the process knows that there is as much room for improvement in the mechanical, as there *usually* is in the chemical, handling of the process. FRANK ALDERMAN GARBUTT.

Los Angeles, Cal., Nov. 7, 1893.

Cyanide at the Poorman Mines.

The workings of the cyanide process at the Poorman silver mines, Colorado, are shown in the following letter to the Gold and Silver Extracting, Mining and Milling Company, Denver, Colo.:

DEAR SIRS:—Your favor requesting information relative to the working of your MacArthur-Forrest process on the Poorman ores has come to hand.

We first started our mill on the Poorman dump ore, which will run from 10 to 30 ounces of silver per ton, and will average about 20 ounces per ton. After running about three weeks on this grade of ore we made a clean-up which showed that we had extracted 85 per cent of the value. Since then we have been running on our second-grade ore taken from the mine, which will average about 50 ounces of silver per ton, and are saving close on to 90 per cent of the value. The ore consists of stephenite, argentiferous galena, metallic and carbonate of iron, lead, sulphur and an occasional per cent of copper. I am pleased to give you this testimonial, as I am highly pleased with the success your cyanide process is having on my ore. Yours very truly, (Signed) N. D. MCKENZIE.

The Poorman silver mines of Colorado, limited.

Studies in Gold-Milling.

NUMBER VI.

Written for the MINING AND SCIENTIFIC PRESS by J. A. Edman.

The principal waste products of gold mills deserve investigation, as a full knowledge of the tailings and slimes in all their conditions is essential to the millman. Many obstacles present themselves in their examination on account of their bulk and the difficulty of concentrating samples without loss of gold. Tailings may be carefully concentrated and examined under the microscope with or without previous thorough grinding as already described, but for the finest slimes recourse must be had to fire assays after very careful sampling. The testimony of the microscope confirms the loss attending concentration without sizing, as often large percentages of heavy sulphides, arsenides, tellurides, etc., are found in the tailings from the best belt concentrators, and always in an extreme division, the size of grain varying from 1-1000 to 1-2500 inch. Where the loss is in metallic gold the coarser tailings generally carry the highest value, while the reverse occurs with slimes both from hard pyritous and oxidized decomposed ores. The distinction between sands and slimes is indefinite as not depending on size of grain alone, as a hard, tough rock will give sands even with 1-1000 inch size of grain, while slimes will form from soft talcose ores and many metallic oxides when much of the material is 1-500 inch in size.

Tailings from chlorination works give evidence of a loss in gold, resulting from fusion of the sulphides in roasting and from insufficient leaching, as well as the occurrence of larger gold particles in the concentrates.

The practice occasionally met with of dumping a mass of almost barren rock into a gold mill cannot be too much condemned, as injury must result to the treatment of the average pay ore. On the contrary, the custom generally followed in Europe, and to some extent in the Eastern States, of sorting the ores at the month of the tunnel, could in many instances be adopted here with advantage, as in many mines certain portions not only of walls and horses, but in the vein matter itself, are found barren, and can with almost unerring certainty be selected by the experienced sorter.

In the sorting and cleaning of his ores, the gold-miner could with advantage study the methods now followed by the coal-miners of the Eastern States. Thoroughness, combined with economy, should be his aim, not cheap mining and milling, which often means but carelessness and waste of gold product. The generally unauthentic statements of cheap mining and milling are, when investigated, often found to be exaggerations of peculiar conditions, and are, as a rule, misleading and injurious both to the miner and the investor. Even now but comparatively few gold mines and mills are so conducted as to be able to present clear and reliable statements of cost of mining and milling, percentage of recovery and of waste for any long-continued period.

Idle mines and silent mills, often with costly and unsuitable machinery, attest the errors of both miner and millman. Wealthy corporations and individuals may afford costly and ill-advised experiments and finally reach even a phenomenal success. The great number of small mines, often managed by the owners, and depending chiefly upon their personal skill and energy for successful development, form an important element in gold-mining, as they furnish the prospectors and explorers of the industry, and if judiciously handled often become great and permanent mines.

To these we may look to rehabilitate the gold-mining industry by a close study of natural laws, by persistent and intelligent effort, by the aid of all available teachings of science, pure and applied, and not least by prompt and systematic co-operation; and it is to these chiefly that the writer offers the preceding studies in gold-milling as his contribution to the permanency and progress of the gold-mining industry. J. A. EDMAN.

Meadow Valley, California, Nov. 8, 1893.

Sinking Shafts Through Quicksand.

M. A. Gobert, a Belgian engineer, has devised an improvement upon the Poetsch process of sinking through water-bearing strata and quicksand. The Poetsch method consists essentially of freezing by passing a current of cold air or a liquid cooled below the freezing point through tubes driven into the soil to be frozen.

Gobert substitutes for the incongeable liquid of Poetsch's plan cooled down below freezing point, liquid anhydrous ammonia, which is sent into the tubes at a temperature above freezing point. The ammonia vaporizes in the tubes, producing an intense cold, which freezes the water-bearing measures or quicksand outside. Moreover, the same ammonia is used indefinitely, being made to circulate through the tubes by a forcing and compressing pump, which therefore constitutes with the tubes a complete refrigerator, thus leading to a considerable saving in plant, and the cold produced is more intense than that obtained with an incongealable liquid cooled down below freezing point. A great advantage claimed for this method is that the pressure inside the tubes can be varied so as to slightly exceed that of the outside pressure due to the height of the liquid column. It has been found by experiment that a temperature of —35° C corresponds with a pressure of 0.9 atmosphere; —32° C with the atmospheric pressure; 30° C with 1.15 atmospheres; —25° C with 1.46 atmospheres, and 20° C with 1.84 atmospheres. By working with a temperature of —32° C the pressure of the gas is equal to that of the atmosphere, and there is, it is claimed, no fear, even in the event of a crack or want of tightness in the joints, of the ammonia oozing out into the soil. As it is easy to ascertain the level of the water around the tubes, the pressure inside them can be regulated in accordance. The tubes are closed at the bottom and have two necks at the top, one for receiving the pipe which introduces the liquid ammonia, and the other that by which the gas is taken off to be again condensed into liqnid. The joints have hitherto been made by screwing one length of tube into another, a practice which fails to secure tight joints, and also weakens the tube at the joint, so that they often break off there when withdrawn from the soil after having served their purpose.

Mr. Gobert has also made an improvement in this respect by threading the ends of the tubes internally so that they can be screwed upon a ring, thus preserving almost the full thickness of metal, while at the same time leaving the outer surface uniform for easy withdrawal. The ends of the tubes are turned, not perpendicular to the sides, but leveled or hollow curved like the gland of a stuffing-box; and for the larger sizes of tubes a flange of dovetail section is formed on the joint-ring. The effect of this arrangement is to produce two grooves, of interoal dovetail section, between the dovetail flange of the ring and the ends of the tube lengths, to receive lead or other washers, which are compressed tightly by the screwing up, thus forming a perfectly tight joint. For the smaller sizes of tubes, the flange of the joint-ring is dispensed with, the ends of the tubes, however, being turned with a bevel, or convex or concave bevel surface, thus forming a single dovetail groove for receiving the lead or other washer.

British Columbia Mines.

Mr. Hepburn Prentice, the mining expert, late of Australia and now in this city, has just returned from a trip through the Kaslo-Slocan and other British Colnmbia mining districts, and Baker City, Oregon.

"There was not much activity in the Kootenai country when I was there," said Mr. Prentice. "Kaslo, which recently had a very great hoom, was exceedingly quiet, and had, in fact, lost a large part of its population. I understand, however, that it is again beginning to take on life, and people are again going in. The mines are producing, notwithstanding the depression in the silver market. The formation about Kaslo is slate, lime and porphyry, and the ledges, which are quite large—as much as eight feet—are of pure galena. The shoots are long and large. The galena is 60 per cent lead. Roughly speaking, it gives 150 ounces of silver, on an average, to the ton. There are numerous instances of several hundred ounces and occasional of one thousand. So yon see that, despite the low price of silver, the mines can be operated at a profit. The ore, carrying such a high percentage of lead, is in demand for smelting, and is shipped to Tacoma, San Francisco and Great Falls.

"I spent a short time in the Okanogan (British Columbia) fields, at Fairview camp. Some of the gold properties are doing well. The ore is low grade and the ledges large.

"I was at Boundary Creek for awhile. There are quite a number of large ledges there, mostly copper, with silver and gold. The ore is low grade, with refractory sulphides. The camp is dnll. A railway and machinery are badly needed. The ore is now bagged and shipped out 60 miles to Marcus, on the Spokane & Northern. There are quite a number of undeveloped properties worth looking after.

"I had no opportunity to see a great deal at Baker City, Or., as winter was coming on and snow was beginning to appear in the mountains. I was favorably impressed with the country, though, and I am convinced that Baker City has a fine future. The mines are both placer and quartz, and are located east, south and west of the city. I visited the Virtue mine, eight miles east of Baker City. They have lately been working in some very good ore, but its value is not made public. I was also at the Maybell and White Swan, in the same vicinity. Both are good properties."

Mr. Prentice was invited to make a visit to the newly-found Alberni district, on Vancouver Island, B. C., but, from what he heard at Victoria, he was not favorably impressed and did not go.

Desquamation and Decay of Rocks and the Formation of Bowlders.

IN THREE PARTS—PART III.

Written for the MINING AND SCIENTIFIC PRESS by Henry G. Hanks, F. G. S. A., F. G. S., ex-State Mineralogist.

Spallanzani (Travels in the Two Sicilies, English Translation, London, 1798, Vol. I, fol. 236) during his ascent of Ætna in 1778 met with some substances of a spherical figure which he thus describes: "In the midst of this immense quantity of scoria, in several places I met with some substances of a spherical figure, which, like the lava, were at first small, but increased in size as I approached the summit of the mountain. These were originally particles of lava ejected from the crater in the eruption mentioned, which assumed a spherical form when they were congealed by the coldness of the air. On examining them I found them in their qualities to perfectly resemble the scoria, and to possess the same magnetism."

From my experience and observation I am led to the opinion that they were really weathered bowlders of lava such as I have seen in Butte county, California, and at Tucson in Arizona.

De Luc (Geological Travels in Some Parts of France, Switzerland and Germany, Vol. II, London, 1813) makes references to the formation of bowlders, and distinctly says that they were neither brought down by rivers, nor are they rounded by running waters. I select the following: "The granite of the greater part of these mountains is subject to decomposition by the action of the air, a decomposition which begins on the angles of the masses, where all these causes have the most power, and continues along the surface as the latter is laid open, unless, from the nature of the granite, which differs in the degree of hardness and tenacity of the ingredients, or from its particular exposure, it happens to be overspread with lichens. This is the source of the granite sand wherewith, as will be seen, the whole country is here covered, and as for the blocks on such rapid slopes as that I have just described, they, being already *rounded* by these actions of the air, slide by their own weight down the sand, whenever after great rains it is fully imbibed with water. From the spot where we stood I pointed out to Mr. Schaul on the opposite side not only clefts similar to that affording a passage to the Zackel with *rounded blocks* on their slopes, but distinct rocks which were composed of masses in strata nearly horizontal certainly still occupying their original situations, though reduced by the erosion of the angles of each mass into blocks apparently separated and piled on each other." (page 510.)

"As for the rounding of the edges of these large blocks, Mr. Preller agreed that since they were all fragments of strata, and since, consequently, their superficies exceeded their thickness, they could never have rolled, but must have slidden on the flat side, and that, therefore, this rounding could not have proceeded from any other cause than that to which I have assigned it; namely, the decomposition of the angles by the action of the air." (p. 540.)

J. MacCulloch published an elaborate paper (London Quarterly Journal of Science, Literature and Arts, July, 1822) "On the Desquamation of Certain Rocks and on Its Connection with the Concretionary Structure."

In this paper the author shows that many of the rocks of the trap family undergo a process of desquamation after long exposure to the air, and are thus gradually resolved into crusts which continue to fall off in succession and at last moulder into clay. Having met with some remarkable instances in which this effect was decidedly independent of any concretionary structure, he was led to specially study the subject, the results of which appear in his paper.

No stratum of clay or decomposed matter was in any instance found at the place where the crust separated from the solid block.

He found that the desquamation of prismatic or cuboidal masses of granite rock took place all round the surface respecting some imaginary point of center, and promising in the progress of time to reduce the whole to a smaller or spheroidal mass.

In "Additional Remarks on the Desquamation of Rocks" the author announced that he had found the same conditions in connection with other rocks than granite and members of the trap family. It was evident therefore that in one instance cited, the desquamation was not produced by the peculiar structure of the rock, but was utterly independent of it.

"Under the same circumstances it might equally be expected to occur in a mass of pure quartz or mica schist of a more simple and homogeneous nature, and in the latter case the schist might desquamate at angles to its fissile tendency. Such an occurrence might excite surprise, but there is no apparent reason why it might not happen in either of these rocks in a separate state as it does when they are intermixed with distinct laminæ."

Buckland (fol. 252) noticed chalk flints collected together at different localities in England. "Immense deposits of gravel occur occasionally on the summit and slopes of the hills, and almost invariably universally in valleys over the whole world in situations to which no torrents or rivers that are now in action could ever have drifted them." (Fol. 227.) (I have myself seen similar deposits, not only in that country, but also near Havre in France. Being harder and therefore better able to resist the forces which disintegrate softer chalk, they have become collected as seen.)

Hibbert (History of the Extinct Volcanoes of the Basin of Neuwied, on the Lower Rhine, London, 1832) describes balls of grauwacke assuming the structure of basalt. These balls are in general so perfectly rounded as to appear the produce of art. In their interior they are of a firm consistence, but near their surface, owing to the diffusion of the oxy-hydrate of iron, they peel off in concentric scales.

Prof. H. D. Rodgers (Geology of Pennsylvania, 1868, Vol. II, part 2, fol. 992) observed the operation of this law in the anthracite croppings of his State. "Every bed of tollerably pure hard anthracite displays at its outcrop and to a small depth below, a prevalence of the ovoid and globular shapes in its loose and weathered lumps. This is a consequence of the tendency to the conchoidal fracture and of that exfoliation and peeling off at the corners and edges which results from alternate wetting and drying and which belongs to nearly all homogeneous earthy aggregates which are similarly exposed to the weather. When the coal is finely laminated and uniform in texture the form resulting from long weathering is ovoid, but when the mass is very homogeneous and cubical on its joints, the shape approaches near to the globular."

Because bowlders are almost always present in the beds of mountain torrents, an almost universal opinion prevails that they are caused by the forces of the stream. My experience convinces me that this is an error.

If a mountain stream, in the bed of which there were many bowlders, could be diverted from its channel and forced to cut a new one, bowlders would soon appear as the waters cut deeper into a soft bedrock or alluvial deposits, and increase in number, although none of them would be the production of the new river, but washed already formed from the banks, and only seemingly collected in the bed because lighter and more easily disintegrated mineral matter had been swept away by the rush of waters.

Referring to the photograph which accompanies this paper, the small globular bodies marked No. 3 were produced by dipping angular fragments of common clay into water and setting them aside for a time, when meniscoid

BOWLDERS IN THE HANKS COLLECTION.

scales separated. This was repeated several times, and the imperfect spheres were the result. No. 1 is a natural squamos E-bowlder from Shasta county. Nos. 2 and 4 are small weathered bowlders of igneous plutonic rock, which I obtained on Sentinel hill, near Tucson, Arizona. No. 5 is a scale from a large bowlder at the same locality. The photograph is reduced to one-third the natural size.

HENRY G. HANKS.

Relocation by Junior Locator.

In a case affecting the relocation of a claim by a junior locator the Supreme Court of Colorado recently held: Section 2324, Revised Statutes U. S., provides that, on failure to perform labor or make improvements on a mining claim to the extent of $100 per year, the claim shall be open to relocation, provided that the original locators, their heirs or assigns, do not resume work before such relocation. Section 2409, General Statutes, provides that if the locator of a mining claim is desirous of taking in part of an overlapping claim which has been abandoned, he may file an additional certificate. Territory abandoned under the former provision may, under the latter, be taken by the owners of the junior location. An additional location certificate, filed by the locator of a claim for one of the purposes enumerated, need not specify for what purpose it was filed. The burden of proving a forfeiture of a mining claim is upon the person alleging it. Where the owner of a claim relocates it under a different name in order to protect his rights and to preserve the claim from location by others, until he can obtain title by deeds from the original owners, and work is done to protect the lode under both titles, such work will inure to the benefit of the original claim, as afterward deeded to him.

Working Mines in the Cœur d'Alenes.

The mines in the Cœur d'Alenes are now giving employment to about 800 men directly. This surface estimate does not include the employment contingent upon the operation of the various properties. The pay roll at present is approximately $3000 per working day, from direct sources, as against a probable pay roll of $8000 per day when the mines throughout the district are in full blast. The following table, given in the Spokane *Review* Nov. 13th, shows the condition of the 15 principal working mines of the silver-lead belt:

MINES.	Present force.	Daily pay roll.	Full capacity.	Daily pay roll.
Bunker Hill and Sullivan	215	$750	400	$1,400
Sierra Nevada	10	35	75	250
Last Chance	.....	.....	125	400
Stemwinder	10	35	125	400
Gem	120	450	150	550
San Francisco	104	400	150	550
Granite	40	150	40	150
Black Bear	.....	.....	75	275
Poorman	194	750	210	800
Standard and Banner	80	300	80	300
Mammoth	10	35	40	150
Tiger	3	30	100	375
Union	4	18	50	175
Morning	.....	.....	250	900
Hunter	.....	.....	150	550
Total	796	$2,950	2,020	$7,225

The Bunker Hill is employing in the neighborhood of 180 men in the mine and the rest of the number in the concentrator and at miscellaneous work. The ten men in the Sierra Nevada, also at Wardner, are doing prospect work. The Last Chance is waiting for a decision of the Supreme Court, and both claimants have announced their intention of working as soon as the result is made known either way. The Stemwinder has a small force working under lease.

Of the mines in Canyon Creek, there is most talk of putting the Tiger into operation soon, Superintendent Cuibertson having returned from the East, it is thought, to take charge of the work again. The Granite is at its best now. The Bear is doing practically nothing. The Poorman is working nearly a full force. Perhaps a dozen men are at work in the Mammoth, and the Union has four men doing contract work. Neither of the mines at Mullan is attempting to do anything.

Thickest Coal Seam.

Prof. A. Lakes writes to the *Colliery Engineer* relative to the thickest coal seam at present known in the world:

This is in Wyoming at Twin creek in the Green vein coal basin. It is 80 feet thick with only one thin parting of shale near the roof, and upward of 300 feet of solid coal underlies the property of 4000 acres. These seams all lie within a thickness of strata of 2500 feet. Eleven seams will average 15 feet. The dip is about 15 degrees to 20 degrees. There are very little impurities or shale parting in these coal seams. There is a 35-foot seam, an 80-foot seam, a 25-foot seam, a 40-foot seam and an 18-foot seam and some 20 or 30 others varying from 4 to 12 feet. It is suggested in the *Colliery Guardian*, from which these notes are taken, that the "working of such great seams without causing subsidence will be a matter of great mechanical interest to engineers."

At Durango, Colo., there was a coal seam said to be upward of 80 or more feet called the Mammoth seam, but in reality it was only a meeting of congeries of several seams none of which exceeded eight feet of clean coal, the intervals being occupied by numerous sandstone and shale partings.

Again at Newcastle, Colo., a very large seam of fairly clean coal was discovered upward of 40 feet in thickness, but this is far outrivaled by the great seam of Wyoming, while several other seams as we have observed in the same series rival the Colorado one in thickness.

The coal in the Wyoming seams has a dark, glossy appearance resembling cannel coal and burns with a bright flame, while the volatile matter is combustible and adds to the value of the fuel. An average analysis of these coals may be roughly stated as:

Moisture	7
Volatile matter	42
Fixed carbon	47
Ash	2

The coal does not coke. The geological horizon appears to be much the same as that in Colorado and the West generally, viz., the Upper or Laramie Cretaceous.

Mechanical Progress.

Effects of Strain on Machinery.

One of the things that most machinists have to learn is that they are not working with materials that are really "unyielding," as iron and steel are commonly considered to be, but with materials that yield readily to every strain imposed upon them, says the *American Machinist.*

It is far too common, when shaping parts of machinery, or when erecting machines, to impose strains of various kinds upon them, and assume that they do not change form on account of those strains. Instead of this, it should be more fully realized that in every case there is a change of form, depending upon the character and amount of strain, and whether or not this change of form will be prejudicial should be considered.

A cast beam, specially designed for extreme rigidity, will yield readily to a small transverse strain, as is perhaps best shown by bench-measuring machines, in which, though the bed of the machine may be what we call extremely rigid, yet a small lifting force applied to one end of it produces a very perceptible effect in the way of bringing the contact points together, an effect which is readily perceived by the present refined methods of measuring.

One of the most vivid proofs of the extreme elasticity of steel is afforded by a very interesting experiment made by Sellers Bancroft at the works of William Sellers & Co. Three cylindrical steel posts, 1½ inches in diameter and 10 feet long, were placed in a vertical position upon a steel disk, the three posts arranged in the form of a triangle. On top of these was placed another steel disk, and arrangements were made by which a pound weight could be very carefully placed upon or removed from the upper disk. An electrical contact was arranged in such a manner that any diminution of length of the columns would cause a bell to ring. It was found that this pound weight was sufficient to make and break the contact, the bell continuing to ring so long as the weight was in place and stopping whenever it was removed.

By experiments made upon specimens of the same bar of steel, and by calculation, it was determined that the steel bars were compressed 1-14,000,000 of an inch, which, it is true, is a very small amount, but then one pound is a very small load for steel posts capable of supporting over 200,000 pounds without permanent deformation, *i. e.*, within the elastic limit of the material, and the experiment shows that even the lightest strain cannot be imposed upon the materials we handle without a corresponding yielding, which yielding may or may not be disregarded according to circumstances.

To this fact that metals always yield under strain is undoubtedly due much of the "wearing to a bearing" that is often considered necessary in new machinery. Machine spindles ground and lapped accurately to a bearing while unloaded and subjected to no strain may not be to a bearing when loaded and in operation, especially if subjected to transverse strain.

Engine crank-shafts deflect by the load of the fly wheel and other strains put upon them. Surfaces scraped to a surface plate are no longer true when differently loaded, or when the weight of the machine itself is allowed to produce distortion.

To Bore Square Holes.

A machine has been brought out by the Square Hole Drilling Machine Company, limited, of 100 c, Queen Victoria street, London, which will, it is claimed, enlarge a 1⅞-inch round hole to a 2-inch square hole, with corners rounded to ¼-inch radius, in 15 minutes, the material worked being Bessemer steel, ¾-inch thick, says *Invention.* A two-inch hexagon hole with sharp corners can be produced in 12 minutes. This machine was originally introduced some time ago, but has recently been remodeled and improved.

Best Kind of Engine.

There is no rule that can be given to determine what kind of engine is best to put in to do work in every place, says the *American Machinist.* The situation and requirements must be carefully examined, the place that the engine must occupy, its size and accessibility, the cost of fuel, the facilities with which water can be obtained, in what quantity and the cost, also the horse-power to be developed, and the work that the power is used for; all factors must be considered. The horse-power required and space that is available will determine largely the style of engine, whether it be horizontal or vertical, the cost of fuel, the amount of water that can be obtained, whether it be simple, compound or compound condensing. Unless fuel is very expensive, it does not pay to compound small engines, say less than 100-horse power, nor would it pay with large engines where fuel is very cheap, or where engines are to be used a short time each year. Have a mechanical engineer to advise, give him every point that you may know regarding your requirements, and of any peculiar features that enter into the same; discuss every feature, and then let him decide which is the best to put in. The features to look for and insist upon are simplicity, strength and good workmanship, economy and durability, close regulation, and that with the requirement that it should not run away if the load by accident should be thrown off. Fancy work can be added to any machine, if required, but it does not add to its effectiveness, durability or economy. There are many good makes of engines, and when one make of engine is singled out, and has said of it that it is the best one to be bought, it is simply untrue; there are a number that one is as good as another. The requirements of the customer will decide whether it would be better to adopt one make in preference to any other. Where several makes are practically the same, strength, style and workmanship, economy and regulation, should be the standard to select from. Close regulation is more to be sought for than any other thing in cotton and woolen mills, and especially where the fine grades of yarns and cloths are made; next comes economy of fuel, but economy of fuel better be sacrificed than regulation.

New Things in Iron Mining.

The most revolutionary thing that has ever occurred in the history of iron mining in America, or the world, is now in actual progress on the Mesaba range, and is proving successful, says the St. Antonio *Express.* At the Biwabic mine, in section 3-58-16, ore loading is going on directly from the ore body, lying as nature left it, at the rate of a 24-ton car every four minutes. The ore is loaded by a steam shovel of 2-ton capacity, which is working directly ahead into the end of a cut. When the cut is completed, and the shovel is able to work sideways, the work will be easier, for there will be less distance to transverse. The shovel handles about four tons per minute, and is loading about 500 tons daily. This week it begins on a 1000-ton daily output, and shipments will be large. The ore is dry and fine grained, and is handled with much ease. The wisdom of stripping off the 30 feet of surface over the ore, which has been generally questioned, is now universally recognized. A few figures, which are now actual verities, will prove of interest. The cost of the stripping of the 30 feet of surface above the ore body has averaged five cents per ton of ore to a depth of 90 feet, and the ore is more than 90 feet deep. The cost of loading the ore from the natural bed without explosives, underground workings, air-shafts and pumping machinery, is less than four cents a ton; total mining cost, nine cents a ton; royalty, 50 cents; freight to Duluth, 80 cents; freight from Duluth to Cleveland, commission, etc., $1.35; total at Cleveland, $2.47; value of ore laid down at Cleveland this season, $3.75; ordinarily, $4.25. The cost of mining the hard ore of the Minnesota mines at Tower is stated to be $1.65 a ton, and the last Government geological report states that this company raises more ore per man than any hard ore mine in the United States. As this machine handles as much ore in four minutes as one man can in a day, its adoption in the mines all through America may be looked for.

Mechanical Wood Carving.

A mechanical system of wood carving has been patented by the Wood Carving Company, limited, of Birmingham, by means of which the decoration of wood in numerous designs can be accomplished cheaply and well. Electric light casings with their carved surfaces can be supplied, we are told, at a cost very little in excess of the plain casings ordinarily in use.

Coal Consumption on Liners.

The American liners New York and Paris burn about 330 tons of coal per day, or about 30,800 pounds per hour, and maintain about 18,000 indicated horse power, which is equivalent to a coal consumption of 1.71 pounds per hour per horse power.

Scientific Progress.

The Future of Aluminum.

The future of aluminum is a subject attracting much attention just now in technical circles. It does not exist in nature, says the London *Spectator*, in any form perceptible by the senses. There is no such thing as aluminum nugget or aluminum dust. It cannot be crushed out or washed out, or even burnt out of the earth, except with the aid of the electric furnace at a temperature of 6000° Fahrenheit; yet it is present in every load of London clay, and wherever else clay-beds lie it exists potentially in quantities and over areas to which even the coal measures cannot be compared either for richness or extent. When once obtained from the clay, its peculiar properties are more obvious and striking than those of any other material. It is beautiful to the eye—whiter than silver, and indestructible by contact with the air. It neither rusts nor tarnishes, is strong, elastic and so light that the imagination almost refuses to conceive it as a metal, the connection between heaviness and strength being almost as firmly established in most minds as that between heaviness and warmth, and refusing to admit any comparison between the comfort afforded by an eiderdown or a sheepskin. The weight is little more than one-third of the corresponding bulk of iron, and of course far less than that in the proportionate amount of silver, gold or lead.

The so-called "aluminum gold," of which watch chains and trinkets were commonly made some years ago, is merely an alloy of copper containing a small percentage of aluminum, which gave to the copper brightness and hardness, with absolute freedom from tarnish. "Aluminum bronze," the material of which the Austrian field-guns are constructed, also contains only some six per cent of aluminum, though the material so produced is of extreme hardness and value for the purposes for which it is used. But the value of pure aluminum—light, strong, non-corroding, lustrous and beautiful to the eye, inoffensive to the senses of taste and smell, and so malleable that (like gold) it can be beaten out into thin foil or drawn into fine wire—is such as to offer an inducement to the discovery of a cheap and simple method of extracting the boundless store in the clay-beds of the world, hardly exceeded by the desire to discover the philosopher's stone itself. Nowhere, indeed, does the old fancy of the transmutation of metals come nearer an apparent realization than in the change from masses of shapeless clay into white and shining blocks of silvery aluminum. Even now, with the existing methods of elaborate chemical treatment, or the intense heat of the electrical furnace, pure aluminum can be bought for 2s per pound in Germany and at 2s 6d per pound in England. Good gun metal—not the rubbish which is sold as "brass" for door-knobs and curtain-poles and other household fittings—costs 6d per pound; but, as the quantity of aluminum represented by a pound-weight is three times that of an equal weight of copper, the cost of the aluminum, bulk for bulk, is in the proportion of 9d to that of 6d for the copper. Compared with the so-called brass, it is already equally cheap and equally strong, with far greater lightness and beauty.

The present cost of aluminum, though still higher than any of the cheap metals, has brought it within the range of every-day life, and its present uses, limited as they are, necessarily bear some relation to the great question of the future of the new metal, and the possibility of realizing the hopes of the metal-worker and the engineer. For all personal equipment which must be carried by the owner, aluminum is rapidly taking the place of every other metal. Its lightness is its obvious recommendation in this case. In the German cavalry, even the stirrup "irons" are now made of aluminum. The men's water-bottles are also of the same light and strong material. In binoculars for field use, and all kinds of scientific instruments for distant and toilsome expeditions, such as Dr. Nansen's Arctic journeys, or observations on high mountains, the same metal takes the place of the heavier brass, when the saving in weight so secured may often make the difference between scientific success or failure. Nearly all the small articles of luxury and ornament usually made in silver or brass are now produced in aluminum, though where weight is not a drawback, the gain is rather one in appearance than in construction. But aluminum thimbles, pen-holders, paper-knives, flasks or cups are so far superior to those made of the ordinary materials that no one who has once made use of them in the new metal will readily return to the older form.

But it is not as a mere accessory to comfort and convenience that real development of the new metal should lie. It is for use at sea that its most marked quality of lightness obviously fits it. The marine engineer, and the naval architect, who are already looking in this direction for a reduction in the weight which is inseparable from loss of efficiency, whether in speed or cargo, cannot neglect the possibilities of a metal which, when mixed in the proportion of 1 to 50, gives to aluminum bronze a hardness and toughness which make it almost as reliable as steel, and which, if the proportions could be reversed, and the strength preserved, would reduce the weights of ships and machinery alike by two-thirds. That is a problem which awaits the metallurgists for solution. The reduction in cost, judging by analogy, can only be a question of time and research. The best steel now costs little more than ½d per pound, while aluminum is 50 times that price. Aluminum exists in far greater quantities than iron, is more widely distributed, and neither the limits of time nor the history of metallurgy forbid us to conjecture that, as the world has seen its age of stone, its age of bronze and its age of iron, so it may before long have embarked on a new and even more prosperous era—the age of aluminum.

The Earth's Interior.

The idea of M. Rateau, as expressed recently to the French Academy of Sciences, is that the phenomena of the earth's crust

are well explained by considering that the planet's interior is molten, and that a layer of gaseous matter separates it from the portion of the crust forming the continents, whereas the sea-beds sink. The gradual escape of the gases, imprisoned under high pressure, will in time exceed the production of new supplies, when the pressure will diminish and the continents fall in, giving rise to more or less crateriform configuration. This is the state in which the moon now appears. Assuming the crust to be 18½ miles thick, the pressure of the gases should be 650 atmospheres, their temperature 900° C., and their density nearly equal to that of water. This theory makes it clear why volcanoes have successively receded inland where the sea has encroached.

Sun Heat.

Those who have paid attention to this subject are aware that the remarkable doctrine first propounded by Helmholtz removed all real doubt from the matter, says Sir Robert Ball in the *Fortnightly Review*. It is to this eminent philosopher we owe an explanation of what at first seemed to be a paradox. He explained now, notwithstanding that the sun radiates its heat so profusely, no indications of the inevitable decline of heat can be as yet discovered.

If the sun had been made from solid coal from center to surface, and if that coal had been burned for the purpose of sustaining the radiation, it can be demonstrated that a few thousand years of solar expenditure at the present rate would suffice to exhaust all the heat which the combustion of that great sphere of fuel could generate. We know, however, that the sun has been radiating heat, not alone for thousands of years, but for millions of years. The existence of fossil plants and animals would alone suffice to demonstrate this fact.

We have thus to account for the extremely remarkable circumstance that our great luminary has radiated forth already a thousand times as much heat as could be generated by the combustion of a sphere of coal as big as the sun is at present, and yet, notwithstanding this expenditure in the past, physics declares that for millions of years to come the sun may continue to dispense light and heat to its attendant worlds with the same abundant prodigality. To have shown how the apparent paradox could be removed is one of the most notable achievements of the great German philosopher.

What Helmholtz did was to refer to the obvious fact that the expenditure of heat by radiation must necessarily lead to shrinkage of the solar volume. This shrinkage has the effect of abstracting from a store of potential energy in the sun, and transforming what it takes into the active form of heat. The transformation advances pari passu with the radiation, so that the loss of heat arising from the radiation is restored by the newly-produced heat derived from the latent reservoir.

Such is an outline of the now famous doctrine universally accepted among physicists. It fulfills the conditions of the problem, and when treated by arithmetical calculation it is not found wanting.

Prof. Barnard on Comets.

Prof. Barnard, of the Lick Observatory, recently gave an interesting lecture on comets in this city.

"Comets," said the speaker, "are bodies of gaseous matter, a little drier toward the middle than at the outsides. As this middle descends toward the sun it grows brighter, and a little star-like body appears and emits jets of brilliant matter, which streams out as a nebulous body and forms the tail. What before was small in dimensions extends to enormous sizes, stretching out 200,000,000 of miles. What this matter is we know not. It is supposed the tail is composed of vapor. This we are not sure of. The spectroscope does not reveal correctly or satisfactorily what they are. Hydrocarbons are found in them. When a comet passes between the earth and a star you can see the star through the comet. You think the star is in front, when it is known positively that the star is farther away than the comet. What the nucleus is composed of we know not. No astronomer has positively seen a nucleus of a comet pass between the earth and a star. So it is not certain whether this center spot is transparent or opaque. It is supposed that the nucleus is composed of meteoric stone."

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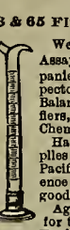

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Electricity.

Telephone Patents.

We still continue to receive inquiries from a great many quarters as to the status of the telephone patents, says *Electricity*, and while we wisb to oblige our readers as far as possible by answering any questions on which information is obtainable, it is manifestly impossible to authoritatively answer a number of inquiries which involve questions that are as yet undecided by the United States Supreme Court; nor can we nndertake to invent or adapt a system of telephony which avoids lnfringing all existing patents; yet it is not impossible to do so and will be less difficult on the expiration of the Bell receiver patent, next year.

In regard to establishing exchanges to compete with systems already existing in different places, operating under the patents of the American Bell Telephone Company, it is very doubtful if such an attempt would prove successful, as the established business would for many reasons bave great advantages over its rival. From the nature of the business there is hardly room for more than one telephone service in any city, as there would be naturally no connections permitted between the subscribers of the rival companies, a conditlon which would be as unsatisfactory to the subscribers as the divided service would be to the telephone companies.

In a city without this service, where a new system is to be installed, the conditions are different. The only trouble in this case would be in arranging the details of the exchange so as to avoid infringements of patents on minor points, of which there are quite a number. For example, the switch on the magnets for ringing up the central, whicb is normally closed by hanging the receiving instrument on the forked handle, is patented, and without this an extra switch would need to be manipulated. Many of the details of the central-station switcbboards are also patented, and considerable work would be involved in arranging the details of a system which would botb secure an efficient service and avoid all infringements on these patents.

Concerning the manufacture of telephone instruments there is less difficulty in the way, and for private lines there are no important obstacles in tbe way of patents which bave not already been overcome.

It is well known that the art of telephony and the Blake transmitter are public property, and tbat the first patent on the Bell receiver will sbortly expire. Tbe Edison patents and the Berliner patent relating to microphones with variable surface contact are still in force, and although tbe validity of the latter patent has been called into question, no decision on this point bas been handed down by the courts. The use of a permanent magnet in the transmitter is also patented, but this is not of much importance, as an electro-magnet may be used there with equally good effect. The variable contact microphone is also not an absolute essential, although it is undoubtedly the most convenient device that can be adopted. This can be replaced, bowever, by a microphone in which the conductivity is varied by the changes of density in the carbon or other material due to varying pressures but with a fixed contact surface. Tbis has been accomplished in various ways, among others by the compression of a carbon spiral.

As the matter stands now, telephones of the pattern at present used by the Bell Company cannot be generally manufactured, but enough of the patents on tbese instruments have expired to permit the free manufacture of very serviceable and effective instruments for this purpose.

Telephones in Chicago.

The Chicago Telephone Company now makes claims to having the most complete, as well as the busiest, telephone exchange in the world. Chicago bas 10,400 telephones, operated in 11 exchanges. The number of "talks" really represents the business of the exchange, and tbey number over 145,000 a day. To accommodate this vast business the company has put down 48 miles of underground conduit, containing 18,000 miles of wire.

Home-Made Electric Batteries.

A wrlter in the *Scientific American* describes a home-made storage battery as follows: I made two cells, each composed of eight 6 by 8 plates. I rolled my plates out of old tea lead melted into a bar. This lead is remarkably pnre and soft and easily worked. I rougbened the plates and coated them with red lead made into a paste with water, and when they were dry I wrapped them witb strips of muslin to hold red lead in place until it could be reduced in the "formation." I did not use sulphuric acid to mix red lead with, as it is not necessary and is bad for hands and clothes.

I used ordinary gravity glass jars for my cells, and connected the cells in series, using a 10 per cent solution of sulphuric acid (commercially) by measure. I charged the two cells at once by a current from six cells of gravity battery, arranged in serles. Charged for eight hours and then discharged storage cells through 10 ohms resistance. Then charged in opposite directions and discharged througb resistance again; then kept charging and discbarging in opposite directions for about ten days, when the cells were in good condition. I never have used more than six gravity cells to charge with, and now keep charging current on all the time.

I nse the cells to actuate my dental mouth lamp and plugger, and am making a motor to run my dental engine. The current from the two cells is strong enough to melt four incbes of No. 20 iron wire and heats a platinum cautery wire wbite bot.

The manufacture and charging of a storage battery presents no difficulties, and its efficiency and power are remarkable, making it "the battery" par excellence.

Cost of Power Transmission.

At a recent meeting of Section G, Britisb Association, Mr. Gisbert Kapp read a paper entitled "Relative Cost of Conductors wlth Different Systems of Electrical Power Transmission." The author said that with the alternate current there is no necessity of bigh insulation of generator or motor, but only of the transformers, whicb can be easlly insulated by tbe use of oil or other means. The autbor dealt with five systems of transmission: 1. Single-phase alternating ing current transmission by two wires. 2. Double-phase alternating current transmission by fonr wires. 3. The same by tbree wires. 4. Three-pbase alternating current transmission by three wires. 5. Continuons current with transmission by two wires. Thus if, for the transmission of a certain power over a given distance by continuous current, 100 tons of copper were required for the line, tben tbe single-phase alternating and the two-phase four-wire system would require 200 tons. The two-pbase three-wire system would require 290 tons, and the tbree-phase three-wire system only 150 tons; therefore, so far as the line might be concerned, there would be a distinct advantage in the employment of the three-phase system.

Electricity in Sanitation.

Electricity in addition to its other manifold uses is a sanitary agent, says *Electricity*. When Prof. Tyndall was experimenting with atmospheric dust in his researches on the origin of the lowest forms of life, he found that an electric discharge passed through a dusty atmosphere purified it by causing the minute particles to settle. And long before these researches it was commonly said and believed that a thunderstorm purified tbe air. Thus a scientific foundation is found for the popular belief, and the lightning flash takes its place as an accredited sanitary agent.

A Large English Scheme.

A plan for the distribution of electric power over a good portion of England is proposed by A. B. H. Thwate. His idea is to burn the fuel at the mines, where it costs but little, and then transmit the power resultlng from tbe combustion of the coal and gas by high-pressure alternating currents of electricity. He proposes to use gas engines of not more than 500-horse power to generate the electricity. From one station be would supply the centers of industry of Lancasbire and the area adjoining the sbip canal; from a second those of Yorkshire; from a third tbose of Midlands and London.

Useful Information.

Ozone.

Tbe name of ozone bas a very peculiar fascination for tbe public, says *Tradesman*. The fact is that ozone is considered as a mysterious agent, to which all sorts of marvelous properties have been attributed about which many "fairy tales" have been told in books and publications, some of which bear scientific repute. Another popular impression is that ozone is a new product that has only lately come withln the ken of scientific men. How far from the truth this belief is is sbown by the fact that in a lecture now being prepared on the subject of ozone by one of the leading electro-therapeutists of America, over 130 authorities are quoted, some of which date back hundreds of years.

Although the virtues of ozone have occasionally been exaggerated, there is no denying that it can render many valuable services, not only for therapeutic or sanitary purposes, but in chemistry and in several industries. The employment of ozone will quickly become more general when it will be possible to compress it and sell it in cylinders, as carbolic acid and oxygen are now sold.

The commercial uses of ozone are innumerable. It is useful in bleaching, as it destroys organic colors, especially in wool, cotton, vegetable fiber, paper pulp, oils and ivory. The improvement of wines and spirits by ozonization is now commercially applied. Light wines, however, cannot be ozonized, unless the operation is conducted with the greatest care, because a too strong treatment gives rise to the formation of aldebydes and vinegar. The expense of aging and refining alcoholic liquids in this way is trifling, as a very small quantity of ozone is required.

Among the physiological uses of ozone, the most important is the purification and disinfection of air and of tapestry hangings in sick rooms and in ships. In the British Museum and several public buildings in London, where large numbers of people congregate, and where the miserable arrangements for ventilation are a disgrace to a civilized commnnity, a successful attempt has recently been made to render the air less poisonous by the introduction of ozone. It is more than likely, too, that as soon as the difficulties whicb now attend the making and application of ozone are reduced, it will be freely used in churches and other places of worship, in which whole congregations now become inattentive and sleepy, often more from the impurity of the air than from the dullness of the sermon.

Ozone is also an insecticide and can be used for the destruction of caterpillars and beetles. The influence of ozone in this respect is seen on passing a supply of it through a flower-pot in the earth in which some worms have been placed. The worms almost immediately force their way to the surface. The experiment has induced some people to try to destroy the insects which cause so much damage to vines, and to have some iron pipes in the vineyards, tbrough which ozone is forced, so as to kill the phylloxera microbe. But this will only be practicable when ozone can be stored and compressed, as well as produced and sold cheaply.

As showing the effect of ozone on animals, it is related that a factory was infested with rats and mice, but as soon as it was utilized for manufacturing ozone the animals completely disappeared. The time will shortly come when the drinking water of all cities will be snbject to the action of ozone, by which many of the ordinary bacteria, snch as those of typhoid, cholera, etc., and their spores are killed. Sewage water or water contaminated by the refuse of works will also be treated by ozone, not only for the killing of bacteria and the decomposing of the ammonia into its constituents, but for the simultaneous oxidation of all the organic substances in suspension.

Among the legions of uses of ozone may also be mentioned the manufacture of ferments for breweries and distilleries and the preparation of yeast where the expulsion of bacteria leaves a pure ferment and prevents after-fermentation.

Some Uses of Hot Water.

Hot water is far more of a medical property tban many believe or know. Because it is to be had for the making thonsands think it valueless, on the theory that what comes easiest is oftentimes least thought of. The uses of hot water are, however, many.

For example, there is nothing that so promptly cuts short congestion of the lungs, sore throat or rheumatism, as hot water when applied promptly and thoroughly.

Headache almost always yields to the simultaneous application of hot water to the feet and back of the neck.

A towel folded several times and dipped in hot water, and quickly wrung out and applied over the toothache or neuralgia, will generally afford prompt relief.

A strip of flannel, or napkin, folded lengthwise and dipped in hot water and wrung out, and then applied around the neck of a child that has the croup, will sometimes bring relief in ten minutes.

Hot water taken freely half an hour before bedtime is helpful in the case of constipation, while it has a most soothing effect upon the stomacb and bowels.

A goblet of hot water taken just after rising, before breakfast, has cured thousands of indigestion, and no simple remedy is more widely recommended by pbysicians to dyspeptics.

How Mail Clerks Assist the Memory.

The railway mail clerks have a unique metbod, says a contemporary, for learning the rontes on which post offices are located. Take, for example, the State of Pennsylvania, in which there are over 5000 offices. The prospective mail distributor buys a quantity of blank cards—about the size of the ordinary visiting card—and on each of these he writes the name of an office. On the back of the card he writes the name of the route by which the office is served with its mail. Taking in hand a package of these cards—say from 50 to 100—he goes over them one after another studiously, looking at tbe back each time and getting the name and route clearly associated in his mind. The second time that he goes through the route he finds that he knows the half of the route by reading the name of the office. It is a dull student who upon going tbrough a pack of cards a dozen times does not know them thoroughly. The method is so simple and such an aid to memorizing that it is adopted by all railway mail clerks. By it clerks have been known to memorize a State like Pennsylvania inside of two months.

On all large routes clerks work but half time, the other half being devoted to rest

and sindy. The mail clerk at home, continually reminded of coming examinations, carries his cards wherever he goes, conning them over at every opportunity. One demonstrative clerk on the New York and Pittsburg R. P. O. is famed for having learned the State of Ohio in four days. As he shuffled over his cards he walked from garret to cellar, and *vice versa*, from dawn notil the shades of twilight fell. On the fourth day he weot to the examioer's office and separated Ohio without an error.

It is related that the wife of a postal clerk adopted the card method for increasing her vocabnlary in French. Oo one side of the card she wrote the French word and on the other the Englisb equivalent to be learned. Another lady, hearing of this, used the same system successfuliy for learning mythology, placing the word "Mars," for instance, on one side of the card aod "war" on the other. The method has so many advantages over the old and tedious way of learning from the pages of a book that it might be utilized with advantage hy teachers in search of new methods of lmparting instruction.

Magnitude of Railway Business.

E. A. Mosely, In an address before the Railroad Trainmen's Convention at Boston, gave some statistics regarding the magnitude of railroad interests in this country. Some of his statements were as follows:

"To transact the business of the railways, there were required last year the services of 33,136 locomotives, of which 8848 were employed in passenger service, 17,559 in freight service, and 6729 in yard servlce and in service not specified. To perform the passenger traffic of this great country last year 28,876 cars were employed, and the freight service of the country gave employment to 966,988; 36,901 cars were required in the service of the railways themselves.

"Putting these figures in a more concrete and definite form, the locomotives of the railways of the Unlted States, if marshaled, with their tenders, into a single line, would make a train 357 miles long. With the passenger cars reported owned last year, we might make a train that would reach from Boston to within fifteen miles of Philadelphia.

"But the most wonderful figures are brought out hy a similar arrangement of cars in freight service. Placing these cars together in a continuous train, it seems almost incredihle that this train would be 7028 miles long, hut so the figures make it appear, and, allowing the distance from Boston to San Francisco to he 3000 miles, our train of freight cars would reach from Boston to San Francisco, from San Francisco hack to Boston, and from Boston again as far west as Chicago. What tonnage they would move at a single load I leave you to conceive if you can."

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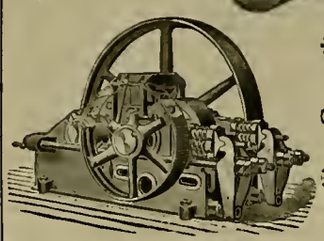

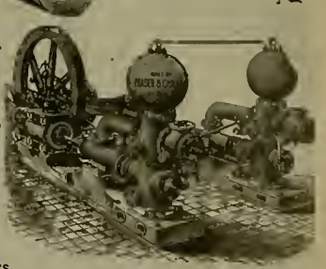

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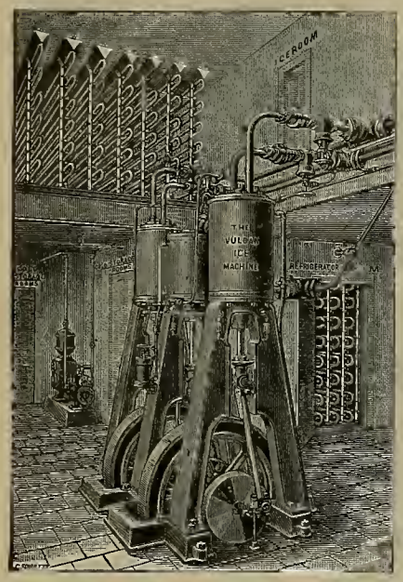

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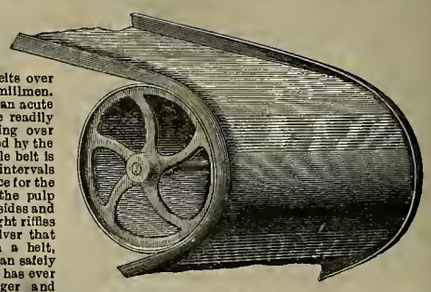

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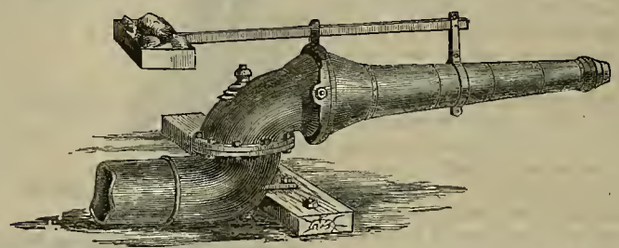

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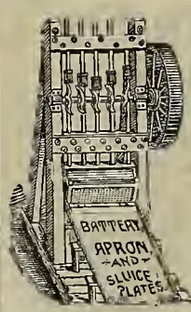

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An Address to the Miners of California.

SAN FRANCISCO, November 21, 1893.

The Midwinter Fair has passed the primary stages of newspaper discnssion, and is now an assnred fact. It is more than that: it ls an assured success. Exhibitors from all parts of the world are applying for space; and, in point of diversity of interest, the Midwinter Fair will be fully up to the hlgh standard of the Columbian Exposition at Chicago. Never since the discovery of gold has California had such a magnificent opportunity to advertise her wonderful and varied resources. Though at first somewhat doubtfnl as to the snccess of the enterprise, the people have suddenly become thoroughly alive to the enormous advantages within their grasp; and, from one end of the State to the other, actlve preparations are in progress for an exteosive display of California's industrles. The farmers and fruit-growers have already arranged for an extensive exhibit of their industries, wherein a spirited rlvalry between the northern and southern portions of the State will add interest and enthusiasm to this feature of the exposition.

The miners must not permit the exhibitlon of their industry to he second to that of the farmer and fruit-grower, nor permit the lmpression to go abroad that the industry that made Californla has given way to the grain field and the orchard. There ls but one thing for the miners to do, and that is to at once, and wlthout delay, prepare an exhibit that will convince the world that California is still a mining State. The miners of Callfornia cannot afford to make a mlstake ln this matter. Not only shonld it be a matter of pride with the mlners to see the Callfornia Mineral Exhibit occupy a leading place at the Midwinter Fair, but it is really a matter of necessity as well. From Montana, from Idaho, from Colorado, from Canada, from New South Wales, and from other parts of the world, will come mineral exhibits that have been notable features of the Chlcago Exposition, and California cannot afford to take second place among the mlneral exhibits. Not only must the world be given to understand that California is still a mining State, but that nowhere can capital find a more profitable field for investment than in the mining regions of California. The opportunity has arrlved, and it will he our eternal loss, as well as our mortification, if we do not promptly seize it and turn it to our great and lasting advantage.

The management of the Midwinter Fair has generously placed at our disposal ten thousand square feet of space in the Mechanic Arts buildlng, and committees, both general and local, have been appolnted to collect and arrange the exhibit. The utmost enthusiasm prevails among the members of the various committees, and there is no lack of active minds and willing hands to carry the enterprise to a snccessful conclusion: but, in addition to all this, there must be raised snfficient funds to properly install and maintain such an exhibit as will do justice to the mining industry of this State. It is estimated that it will require about twenty-five thonsand dollars to install and maintaln such an exhibit. The cost of arranging and putting in place such an exhlbit will be considerable, besides whlch there will be the cost of maintainlng the same for six months. The Executive Commlttee of the mining exhibit have estimated the cost very carefully, and do not see how a proper exhibit of the mineral wealth of California can be arranged and maintained for much less than the above sum.

This sum must all be ralsed by voluntary subscription, for the Midwinter Fair management is unable to render any financial assistance to the miners, though it has donated the space for the exhibit free of cost. It is believed that a proper mineral exhiblt will turn the attention of capitalists in the direction of our mines, and will mark a new era of prosperity for our partially neglected lndustry. To this end should our energies be directed; and every mlner, and every person interested ln the mines, and every person deriving profit from them, should, within the limits of his ability, do what he can to aid the cause we have so much at heart. "Many hands make llght work," and so will the burden fall llghtly on each lndividual if the cootributions he generally distrlbuted among those who are interested in the mining cause.

We have but a few weeks left in which to prepare and arrange our exhlbit, and any delay at this time would be fatal to the success of the enterprise. There is no danger of that, however, for the work is golng rapidly forward, and the miners are responding promptly and enthusiastlcally to the call for aid.

The times are propitious; the products of our mines are needed for the purposes of commerce, and now an exceptional occasion has arisen for the display and advertisement of our industry. Let us seize the full advantage of this splendid opportunity; and, when the Mldwinter Fair shall close its gates next June, let the verdict go forth to every part of the earth that Californla leads the world in mineral wealth, and that beneath her giant hills lie hidden stores of priceless treasure to reward the enterprise of man.

The Executive Committee of the Californla Mining Exhiblt of the Midwinter Fair.

By J. J. CRAWFORD, Chairman.

Coast Industrial Notes.

—Work on the Glla dam in Arizona is to begin in January.

—Oregon is shipping apples to Denver, Colo., in large quantities.

—It is reported that 300 men are at work on the Fort Bragg railway.

—The Fresno high school bonds have been sold to Denver capltalists.

—The lumher mills at Glenbrook, Lake Tahoe, have closed down for the season.

—An electric road between Chino and Pomona, in southern California, is proposed.

—The Treasurer of San Diego has placed the city's money, amounting to $30,000, in a safe-deposit box.

—Plans are reported to be nearly completed for the extension of the Pasadena electric road to the coast.

—The Pendleton (Or.) Savings Bank, which suspended in July, resnmed recently with increased resources.

—The Belmont farm, near Esquimalt, has been purchased hy the British Government, it being required for the new fortifications.

—Southern Oregon ranchers have been going to Yreka in large numbers lately to secure winter supplles of fruit, flour, dry goods and groceries.

—W. H. Mills, general land agent of the Central Pacific Railroad, has been elected a director in the same company, to fill the vacancy caused by the death of H. A. Cummings.

—The Davie Ferry Company, whlch has been for several months running active opposition to the Southern Pacific ferry system, is ln financial trouble, and has ceased operations.

—Richard H. McDonald Jr. and his brother have finally retlred from the management of the Pacific Bank, San Francisco, and the Bank Commissioners are in full and undisputed control.

—The largest galvanized iron tank ever made in Riverside has just been completed by J. Shiels & Sons. It holds 9000 gallons, and is for J. R. Newberry & Co., in whlch to store gasoline.

—Fifty thousand tons of heets have been delivered at the Watsonville Sugar Works, and 25,000 tons more will be delivered before the season closes. Every ton thus dellvered means $5, or a total of $375,000.

—A corps of engineers have been at Winslow, A. T., looklng over the country with a view of putting in a canal. They visited Hay lake, near that place, where it ls said a reservoir can be constructed sufficient to hold water enongh to irrigate 200,000 acres.

—The Stockton Combined Harvester Works, which have been shut down ever since the commencement of the financial crisis, will resume operations on January 1st next. Nearly all the old employes have remained in Stockton, and from 40 to 50 of them will be given employment. The firm has nearly $40,000 worth of work to be completed and will not again shut down till the usual dull season arrives.

—Edward J. Read, B. L. McKays and G. A. Anderson of Deming, N. M., have filed articles of incorporation for the Rio Grande Valley Irrigatlon Company, wlth a capital stock of $1,000,000. The charter calls for a canal line beginning on the Rio Grande at White Rock canyon, west of Santa Fé, and skirting the foothills of the valley on the east slde of the river and running south 150 mlles. Thls is the second charter that has been taken out coverlng practlcally the same territory, and a lively conflict over the right of way is expected to arise.

—The principal local savings banks have so much coin in their vaults that they are waiving the full term of six months' notices usually demanded of term depositors before money can be withdrawn. Many depositors who gave notice of their intention to regain possession of their funds during June and July will now have an opportunity of doing so, but it is doubtful whether many will avail themselves of the privilege. Notices that money may be withdrawn in advance of the usual time have been sent ont by the Mutual Savings Bank and the German Savings and Loan Society.

—Late Saturday afternoon (Nov. 11) the waters of Yuba were let into the cut-off, says the Sutter *Independent*, and soon flowed through lts entire length to the full width of the deep channel in the center. By Sunday afternoon the volume of water flowing ln had considerably increased, as the sand and slickens at the inlet washed out and wldened the entrance. It was estlmated that half the water of the Yuba was flowing through the new channel and a marked difference could be seen at the old mouth. The contract ls practically completed, and the contractors have done a good job.

—Pres. Blakely of the Nevada Sonthern, C. Mulholland and others engaged in the work of raising an $80,000 loan in southern California, are well satisfied with the progress made, says the Los Angeles *Express*. The enthusiastic and business-like meetlng at Pasadena gave the enterprise a new impetus. Citizens of San Bernardino have also asked that a meeting be held there to present the matter to the people. It ls understood that, so far, Los Angeles business firms and private indivlduals have pledged about $40,000, and additional assurances are given by whlch the amount will be increased a little later. The prospect of raising the entire amount needed for immediate heavy work on the roadbed seems very good.

—A special committee, appolnted by the Oakland Clty Council to investigate the water questlon, has received bids from parties who are willing to contract to furnish water to the city. The proposals were made on the basis of the rate per 1000 gallons for different quantitles, ranging from 2,500,000 gallons per day to 10,000,000, the water to be delivered at the eastern end of the city, under a pressure of 50 pounds per square inch. The blds were as follows:

	First bid, Cents.	Second, Cents.	Third, Cents.
2,500,000 gallons.....	4½	8	10
3,500,000 "	4¼	7¾	9
5,000,000 "	3¾	7½	8
6,000,000 "	3½	7	7
8,000,000 "	3¼	6	7
10,000,000 "	3	5½	7

—A rumor comes via Victoria that a new line of steamers will be run from the ports ln British Columbia and on the Sound to San Francisco during the continuance of the Midwinter Fair. The vessels to be displaced by the construction of new ones for the Gulon Line, now operatlng between New York and London, are mentioned as those whlch will be utilized for the projected service. A recent visit to the Sound cities by officers of the Guion Line, the Dominion Steamship Line and the Canadian Pacific Railway gave rise to the rumor. The steamers spoken of are the Alaska, Arizona and one other. All three are over 4000 tons net and average sixteen knots, reducing the time between Victoria and San Francisco to less than two days.

—The contract for constructing the first section of the Government jetty and revetments and the approach thereto at the mouth of the San Dlego harbor, which was let to S. R. Smith of Portland, Or., has evidently proved too much for that gentleman to handle alone. In the first place his bid was so low as to admit of only a nominal profit even if the job was handled to the best possible advantage. The contractor dld not control enough money to complete his contract. This condltlon of affairs caused considerable dissatisfaction, whlch culminated at the quarries last week when the stonemen refused to work longer without pay. The work at the jetty was closed down soon afterward. Contractor Smith is said to have succeeded in arranging to have the Cuyamaca Railroad Company assume his obligations and continue the work on the jetty.

Here is where the mind must dwell and rest. Not on our trials, weaknesses, follies, failures, sins; we can do better. The good things are most real, the best things are most true, the greatest things are most sure. What the light shows—the vision of spiritual reality—to that let us forever make fast.—Rev. Charles G. Ames.

Never esteem anything as of advantage to thee that shall make thee break thy word or lose thy self-respect. Remember this: That there is a proper dignity and proportion to be observed in the performance of every act of life.—Marcus Aurelius.

He who receives a good turn should never forget it; he who does one should never remember it.—Charren.

Our grand business ls not to see what lies dimly at a distance, but to do what lies clearly at hand.—Carlyle.

Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

AT THE MAYFLOWER.—*Ledger*, Nov. 16: Stephen H. Emmens, maneger of the Mayflower mine, formerly the Bunker Hill, was in Jackson on Fridey last accompanied by his son and Supt. Crocker of the property. The new company which recently took hold of these properties propose to thoronghly prospect and develop their gronnd in an economical and business-like manner. Mr. Emmens, who is a consnlting engineer and chemist, has had a great deal of experience in mining in other States and conntries, and hopes to find a good-paying mine at the Mayflower.

At the Albany the carpenters are at work erecting a building over the Middle Bar shaft.

At the Wildman sinking is in progress. The shaft is now below the 1100-foot level, and it is the design of the snperinteudeut to go down 200 feet farther.

The main building of the Alma has been raised during the week, and the gallows frame is in position. The machinery which was purchased some time ago is expected daily.

W. H. Stowers, a mining engineer, representing the State Mining Bnreau, is making a critical examination of the mines along the mother lode. He is at present in Jackson, accompanied by his wife and child.

John Myers resigned his position at the Mayflower near Amedor and has taken a position neer Oroville. N. W. Crocker, formerly superintendent of the Bunker Hill, hes assnmed the snperintendency of the Mayflower properties.

At the 800-foot level the Hardenbnrg people drifted north 200 feet and south about 175 feet, and then crossent to the ore body bnt a few feet away, finding a ledge of quartz from four to five feet in thickness. They were delighted with their prospect, and rumors are now afloat that in a short time the Hardenburg mill will be ponnding away on profitable rock.

Head mechanic V. S. Garbarini at the Kennedy has been very busy of late making new improvemeuts. He has about completed a large and commodious blacksmith-shop and is now at work erecting a new gallows frame at the south shaft. The work is being done in the most snbstantial manner, and, when completed, will be the best and most durable mining improvements so far made in the county.

AT THE BAY STATE.—Cor. *Record*: Superintendent Jones of the Bay State informs me that the concrete bulkhead in the mine will be completed to-day, November 16th. They have two pipes through the dam, one eight and the other four inches. With valves the pump can be put to work at any time desired, and also the water tubs if necessary, to rednce water in the mine without interfering with the sinking. The hills in the vicinity are full of prospectors, and a good many, notwithstanding the law that releases them from assessment work for the present year, are doing their assessment as usual.

Butte.

A NEW VENTURE.—Biggs *Argus*, Nov. 16: S. J. Bruton, W. Ralph, James Gallagher, John Woods and several others are making arrangements to prospect in the monntains near Bangor for gold. Outside of shovel, pick and pan, they estimate the actnal expense of each man at only $9 for a month.

EXTENSIVE DEVELOPMENTS.—Oroville *Register*, Nov. 16: Within the past few years the developments in this county have been marked and extensive. At Forbestown there are now three quartz mills with eight stamps, and a fourth mill is being built which will give ten more stamps.

At Oregon City, within the past year, two mills have been built and one is now in operation and the other will be in a short time.

At Hurleton a new mill has been built within a year, and two other mines have been developed so extensively that mills will be erected.

There has been a new mill built by D. K. Perkins at the summit of the mountains near Gravel Range, while the mining developments about Bangor have been great, and 100 men are now employed where two years ago not ten found work.

A new mill was erected this season at Nimshew. It is thought that the qnartz mill on the Banner mine will soon be started.

There have been more ledges opened and more mines developed in Butte within the past two years than during the six years that preceded 1892. This progress is by many thonght only a beginning, and the sangnine ones predict that Bntte will yet become the banner mining county of California.

The shaft in the Stow mine at Dutch Ravine is now down 165 feet, and from the bottom of it two levels, each 500 feet long, will now be run. At the Phœnix mine 12 men are working, and some very fine rock has lately been taken out. No work is being done at present in the Pactolian.

BANNER MINE SOLD.—Oroville *Register*: Maj. McLanghlin has bonght from W. E. Phillips and the Hazard Mining Company the property locally known as the Banner quartz mill and mine. This property the major has sold to the Development Syndicate, limited, of London. The mines inclnde the Banner, Banner Extension, Amosky and the Clark & Coffee ledges. In an early day the top gronnd of the Banner ledge was worked and proved very rich. The shaft is now down 500 feet, and it is reported that fine rock has been struck in the lower levels.

Calaveras.

BEAT ALL RECORDS.—Stockton *Independent*: The October yield of the famous Utica mine at Angels beat all records, as James Cross puts it,

giving the owners a clear profit of $142,000. The clsan-up amounted to $182,000. Of this snm, Messenger McConnell brought down $71,000 on the 19th of October, and the balance of $111,000 was brought through recently. The cost of operating the mine and the big 100-stamp mill is $40,000 a month, leaving the deserving owners a profit of $47,334 each for the past month. The mine is ownsd by Alvinza Hayward, the Hobart estate and C. D. Lane, the general manager. Jas. Cross, sxecntor of the Hobart estate, was in town recently on his return from the mine. He was as well pleased with the great clean-up as he would have been if he was one of the lncky owners. Col. Hayward and Mr. Lane were also pressnt when the clean-np was made, the latter having recently retnrned from a visit to the East. These three gentlemen meet at the mine regularly each month.

El Dorado.

BEING REOPENED.—*Republican:* The Melton mine at Grizzly Flat is being reopsned by an Eastern company. The men employed so far have bsen cleaning ont the ditch and doing other work preparatory to getting into the mine.

Kern.

PLACER MINING CLAIMS.—*Echo:* The following mining locations have bsen made: J. W. Ahern, J. S. Douglas, D. V. Bnrton and L. A. Burton, 20-acre mining claim in the Valley View mining district; W. J. Snllivan, 20-acre placer claim, two miles northeast of the old stage station in Red Rock canyon; W. Black, 20-acre placer claim in the same locality. These two last filings cover gronnd in the new mining camp 30 miles north of Mojave, which has caused so mnch excitement.

Lassen.

STRUCK IT AT LAST.—*Advocate:* During the past few daye there has been exhibited in Susanville a fine lot of gold specimene amounting to about $40, the resnlt of 20 pans of gravel from a claim at old Cariboo, on the north fork of the Feather river. The claim is owned by W. B. Long, J. C. Long and Arch Harper, and has been prospected and worked by the first named for the past five or six years. The gold is smooth washed—the regular channel prodnct—and will go $18 an onnce at least. The owners are confident that they have unearthed a bonanza, and from the above showing it certainly looks as thongh they had.

Madera.

BRIGHTENING UP.—Mariposa *Gazette:* Mining aronnd Grnh gulch, Madera conty, has brightened up again and a steady boom of prosperity overhangs the camp. A new 10-stamp mill has been erected and an electric plant in the Fresno river will furnish all needed power.

Mariposa.

ACTIVITY IN MINES.—*Gazette:* Matters begin to assume a business-like air aronnd Mariposa. Minere and prospectors seem to spring np everywhere. A camp of abont 20 men is located at what is called the McCann epring or May Gronnd, a mile or so above town. Strange men are fonnd in every gulch. If any gold can be found in Mariposa, this winter will surely prove the fact. Most of the prospectors appear to be quiet, industrious men, who work steadily, with a view to finding ont what is concealed in onr hille and gulches. Some of the developed mines of the neighborhood are also being worked on a small scale and from one or two, very satisfactory results have been obtained. The Helm Bros. of Whitlocks made a clean-np last week of 50 tons of rock, from which they realized 27 ounces. The gold of that locality generally brings $17 and $17.50 to the onnce. This made a very snug snm.

NEW MILL.—*Gazette:* A five-stamp mill is to be erected very soon on Missouri gulch, just above town. The lumber and machinery are to be on the ground next week.

Nevada.

THE NORAMBAOUA.—*Telegraph:* Those who are now working the Noramhagua mine are contending with very hard ground. The tunnel is being driven ahead ae fast as possible with the object of cutting the ledge. Mr. Wm. Campbell, who is the principal owner in the mine, informs us that the tunnel will only have to he run abont 50 feet before the ledge is encountered. It is expected that the ledge will be tapped along abont the first part of January.

COMING TO THE FRONT.—*Transcript,* Nov. 17: Under date of the 13th instant M. Kinzle writes as followe from the Centennial, which is located in Washington township, this county: "Ae you might expect, from my last letter, the ground in the top of the second crosscnt we are running is mnch softer and the gravel hed is making down into it, with bedrook and all prospects onr way, in addition to what we have already developed elsewhere in the mine. The Centennial is bound to step forward in the front rank among the gravel gold mines as soon as we get to waehing. As to the San Jose mine, which adjoins ns on the eonth, our respective workings are some 2000 feet apart, the Oentennial heing about 40 feet the lowest, or will be when we connect. They are doing mighty well, and taking ont gold that I have seen, piecee of which weigh from five to eight dollars. Onr course gold lies in that direction and we must have it as well as they."

TO START UP.—*Transcript,* Mov. 17: The new hoisting machinery at the Champion mine will he started Saturday. All the directors of the company will arrive here thie evening, so as to be present when the big machinery is set in motion.

FIRST BLAST IN TWELVE YEARS.—*Union,* Nov. 16: The old Exceleior hydranlic mine at Smartsville, which was closed down by the valley wreckers twelve years ago, is now in full opsration again and the work is progressing favorably. The workmen met with great success the other day when they fired off a huge hlast. It was the first large one that had awakened the hills in that vicinity for mauy years.

THE ALLISON RANCH.—*Union,* Nov. 16: Abont a dozen men are at work repairing the ditch which will convey water to the famous Allison Ranch mine. In the spring employment will be given to a very large number of men withont a donht. The company which has hesn formed to work the mine will spend in the neighhorhood of $200,000 if necessary to develop the property.

Placer.

NEW MILL.—*Herald:* A new stamp mill is heing hanled from Anburn station to Gresn Valley, on the American river opposits Alta. It is to be erected on a cement gravel mine which has been opsned np hy an Oakland company, and in which, according to the reports that have come to ns, prospects are very fine. Mr. Ames is the superintendent.

THE ALTA MINES. — Placer *Herald:* The Bonanza mine at Alta, Andy Rodgers, supsrintendent, has its tnnnel in about 600 feet. At this distance they mads an npraise of 120 feet and struck gravel which is believed to be in ths rim of the channel. Though they are across the river from the Monntain Gate mine at Damascus, they are prospecting for the same channel. If it proves as rich on the north side of the river as it has been on the sonth eide, and there is no reason why it shonld not, the Bonanza, which has heretofore attracted bnt little attention, may be heard from hefore a great while as another dividend-payer for Placer conty. Mr. Rodgers has great confidence in the ontcome, and in the mineral wealth of the district, as is evidenced from the fact that very recently he purchased the Golden Eagle mine, consieting of 360 acres, in the eame locality, from Mr. H. D. Dresler. The prospect of these properties opening np well, in connection with the favorahle development in Green valley, gives strong hope of a revival of business in that portion of the conuty.

Riverside.

IN GOOD OEE.—*Press:* Ex-Governor H. G. Blaisdel of Nevada is spending considerable time, energy and money in developing a mining claim hetween Perris and Elsinore. He saye the ore thev are now taking ont of the mine mille about $12 per ton, and the prospects are good for a better grade. It is the intention to thoroughly test this mine, and, if the grade of ore continues to improve, a large stamp-mill will be put in.

Sacramento.

VALUABLE DIOOINOS.—According to the Folsom *Telegraph,* a gentleman from Colorado has been quietly moving through the mining camps abont there the past week, and he nnhesitatingly prononncee the locality as yet the best gold camp he knows of. He says a rewaeh of the old workings by appliances now obtainable wonld prodnce mnch more gold than they are getting from the much-vaunted gold fields of Cripple Creek, Colo. The Chinese, he says, are the only placer miners in this section, so far as he can discover, who make any effort to save anything hnt coarse gold. The gentleman says it is hie intention to interest some parties who are fnlly prepared to do the camp justice.

Shasta.

GOON OEE, BUT HARN TO MILL.—*Democrat:* Warren Dunham of Igo, who has several good mining properties both at Muletown and at Sonth Fork, has ore that is very rich, hut like many other mine-owners finde it difficult to work it and save the gold. It is the same old tronble—no process at home, and only the richest ore will pay to ship. But in time the difficulty will be overcome and then Shasta county will boom in earnest.

Sierra.

PREPARING TO HYDRAULIO.—*Mountain Messenger:* A. D. Gassaway has returned from French Corral and Sweetland, Nevada county, where he has been working on the eurveye and estimates of some imponnding dams for the Kate Hays, or Milton Mining Co.

The B. M. Ex. Co. is going along qnietly, also the Rnby mine, working the nsual number of men.

A crosscnt is being made from the bottom of the shaft to the ledge in the Golden King mine. This distance, we learn, will not be over sixteen or twenty feet. This shaft is expected to develop the mine, as it will he at a depth of from 160 to 180 feet perpendicular.

The Mt. Moriah mine has a list of about 150 men, who are all hard at work with a hope that everything may be in working order at the mine and mill hefore snow flies. The tramway will he of elevated buckets, so the snow will have to fall pretty deep to interfere in conducting the ore to the mill.

The contractors are sinking on the Idaho quartz mine with favorable prospects. Ten men are at work at that mine. It ie reported that there will be hoisting works pnt np thie fall. The partiee from below who are managing this property were np thie week and report everything satisfactory.

G. K. Orr, of Slate Creek, reports the shaft nnder good headway, and that the finme, 3½ miles long, of the Slate Creek Mining Company's claim, the largest ever in Plumas or Sierra counties, will he completed in two weeke nnder the ahle enpervision of Snpt. J. W. Moyle. Mr. Orr came here to lay in winter snppliee for the New Orleans drift mine on Little Grizzly, near Poker Flat, where he is a etockholder and snperintendent. A good prospect has been obtained.

THE EMPIRE.—*Mountain Messenger:* At the Empire mine in Gold Valley, a very handsome showing has been made lately. The shaft is down 220 feet below the croppings. The ledge is six fest wide to the depth of 200 feet, bnt within the last 20 feet it has gradnally widened nntil it is 10 feet wide at ths hottom of the shaft. The six feet of the ledge lying nearest the footwall runs fully 40 psr cent sulphnrets. The fonr feet next to the hanging-wall is mostly white rock with sprinkling of sulphnrets. On acconnt of the nearness of the winter no further work will be done. When spring opens hoisting works will he erected, ths mill remodeled, and the plant put into active operation.

San Diego.

ONE MAN'S WORK.—Nnevo *Sentinel:* Charles Cox has hesn working on the Tom Scott mine since the latter part of June. He has, single-handed and alone, rnn 250 fest of tnnnel and tapped the Good Hope ledge, opening np a hody of very fine ore. He will also rnn a crosscut to the Tom Scott ledge. The mine was worked with good results in the early days of the camp, bnt with the litigation over the boundaries of the Cuyamaca grant was abandoned. The indications now point to the development of a very fins mining property.

MAY PUT IN A MILL.—*Vidette:* H. Smith and G. Williams have leased the New Discovery mine, situated on the Scholdsr ranch at Mesa Grande. They have sunk a shaft to a depth of 35 feet and have taken ont ahout five tons of ore which will mill at $20 or more psr ton. As soon as the mine is in shape to work they will put np a small quartz mill.

Trinity.

TO BUY MINES.—*Journal,* Nov. 18: William Berry, accompanied hy Frank Adams, a mining man of Placer county, arrived last Sunday. Thursday morning they left for Canyon Creek. Mr. Adams, in conjunction with J. L. Thacker of San Francisco and E. S. Evans of St. Paul, have made arrangements to pnrchase the Silver Gray mine. They will prospect the mine thoroughly, and if satisfied with the outlook will bny it at an agreed price.

A GOON CAMP.—New River Cor. Trinity *Journal:* Abont the usnal amonnt of mines are in operation in here, with very good results. A. G. Fulmore sold a prospect a few weeks ago that he located last January to Mr. Geo. Fernie, of Phillipsburg, Montana. The mine is known as the Lost Hope, and shows np favorably, thus far, for the amount of development done. The purchase price is ahont $2000. Since Mr. Fernie has taken possession of the mine he has taken ont about 75 tone of ore, which he is having crushed at the Excelsior mill.

Messrs. Campton and Phillips of Rhonerville, Humholdt conty, have been np here doing assessment work on their mine, which is sitnated on the Pony Creek divide, abont two miles from here. Mr. Campton showed us a small quantity of amalgam, which he said he realized from one ponnd of qnartz. It weighed exactly 25 cents, or $500 per ton. It may be safe to state that this must have come from a rich pocket in the ledge. No donbt, however, after further development work, this mine will turn out well, ae the ledge stands almost upright east and west, pitching a little to the north in a solid formation.

P. H. Loring of Callahan's ie working the Grover Cleveland. He has James Mullane's pack-train engaged in packing ore to the Uncle Sam mill.

The Sherwood mine, which is and has been the best-paying mine in camp, is producing abont two tons of ore per day. There are several men engaged there nnder the sunervision of two of onr best practical miners, Leas and Nicholson.

The old firm of Miller & Stone is again re-established. They have just taken a lease on the Brizard mine for a certain number of years. Ae this mine is an extension of the "Sherwood," there is no reason to think that it will not be just as good a mine as the former after it ie opened np.

Mr. Badger and Mr. Winkler, two silver men from Colorado, arrived here a few days ago from North Fork. They are looking around the mines, and have not decided as yet whether they will remain here all winter or not.

Tuolumne.

THE APP.—*Independent,* Nov. 18: The shaft is now snnk 20 feet helow the 800-foot level for sump pnrposes. The company will now commence drifting and opening np the 800 level by drifts north and eonth. The mill is uot running, owing to the huilding of new flumes to connect with mill, and when the work is completed crushing will be resnmed to clean np the ore dumps; then the rich rock now stowed away in the levels in the mine will be raised and milled. The accumnlations are several hnndred tons.

DUTCH MINE.—At this mine there is not much to report eince onr last, except that from No. 2 shaft a crosscnt has been entered into the hanging wall, which ie of green rock formation, and a fine hody of ore has been developed, which shows gold freely, so far, ten feet in width.

THE STENT MINE.—Since our last visit to this property, a west crosscut drift has been entered ahont 40 or 50 feet in length and a solid vein of three to four feet was intersected which shows free gold. A new hoisting worke building has been erected 28x42 feet. Mr. Stent, the superintendent, ie in San Francisco ohtaining new machinery for hoist, and is expected back to the mine on Thnrsday, the 16th. This fine property gives great promise as the developments proceed. It ie located on the sonth slope of Quartz Mountain, formerly the Miller & Holmes.

THE NEW ERA.—The owners of this mine are eteadily sinking their ehaft. The rock is hard, with a diahase foot-wall. Good prospects, with gold showing in the qnartz. With a eteady syetem of development, this mine will make a good ehowing, hut capital ie needed to enlarge the works, and power to run Burleigh drills, which would sxpedite the sinking greatly. This claim is only in its infancy. Drifting will he in order when the shaft is sufficiently desp.

THE CRYSTALLINE MINE.— This property is heing vigorously developed. The immediate work is drifting from north shaft sonth to No. 2 shaft. They will soon connect, having only a few feet before connection will he made; distance hstween the two shafts, 65 feet. The mine will then be well vsntilated. Ths above explorations are on what is known as the east vein, a fine body of quartz showing rich gold. The works are situated near to the north honndary and adjoining ths Alabama mine. The bowlder vsin is sitnated directly to ths west. The croppings ars massive and should he crosscnt from No. 1 shaft from esst vein, which would intersect the howlder lode, and where, no donbt, a parallel shoot will he found, as the immense croppings give good prospects. About 300 feet south a shaft is snnk 60 fest on the bowlder vein. The rock milled 16 per tou, in talc formation. Again, near the south houndary, work has heen developed on the east vein by a tunnel 225 fest in length; by continning this work 80 feet the howlder lods would he reached. This would give 200 feet of backs. Rock value at presnnt, tunnel level, $4 to $5. Again, hy further drifting on ssms level, 40 feet ahead, the west veiu would be intersected, makiug a total of prospective develoupmsnt 120 feet. Thie would open up the soutb end of the mine hy a good eystem of crosscutting. The west vein carries good pay rock. Nine stamps are running during the day on rich rock from the north drift. Owing to a scarcity of water at this season of the year the mill cannot run continuously, bnt hy an outlay of capital water can be had on this mine all the year round.

THE PACIFIC.—This miue is located on the mother lode and joins the Sweney on the north. Negotiations have been pending for some weeks for the sale of this mine and all papers were signed on Wednesday last for the sale. O. S. Oressey of Providence, R. I., is now in possession of the property.

TARANTULA.—Thie mine is located north of the Alameda and south of the O. K., on the same vein, the mother lode of California. Within the area of the mine the howlder and east veins are fonnd. There is a shaft nearly 100 feet deep which exposes a large body of pay ore some 10 or 12 feet in width. Further, there is a smaller vein that has paid 50 per ton. It is fine property, and only requires developing to make it a payable speculation to any one seeking investment.

NEVADA.

Washoe District.

THE RULE PROJECT.—Virginia City *Chronicle,* Nov. 16: The Con. Virginia shaft is now in good repair to the 1000 level and the work of cutting ont the shaft station is in progress. The repairs to the ehaft were completed on Tuesday and the latter work then hegun. The air pipes to the 1000 level are all in aud are in working order, and the hlower at the month of the air shaft was started yesterday. Everything about the works ie going smoothly, and the merry whir of the engines, and the materials and muddy care scattered about give the place a bueiness air.

The point where the excavation is heing made for the station is in good ground and the work is going ahead at a speed commensurate with the favorable conditions. The station chamber will take several daye for its construction. It will be abont 11 feet wide in the clear, and 9 feet high and hetween 20 and 30 feet in length back from the shaft. As soon as the station has been completed, drift toward the point where the ore body is said to lie will he begun.

The drift will he in virgin ground all the way to the objective point and also in the ledge or close to it. The location of the ore hody is three or four hnndred feet in a soutbeasterly direction from the station, and it is possible that ore will be found at any or several pointe along the entire ronte. The ground is good prospecting gronnd all the way, and it will he nothing strange if a deposit of ore is found in it.

Ae is well known, the Comstock ledge, running north and south, trends a little north by east and south hy west. The Rule drift will cut across the ledge in the direction of south hy eaet, and the relative positions of the drift and the ledge will be like those of the hlades of a slightly open pair of shears. It will thus he seen that, generally speaking, the drift and the ledge will he together all of the time. The Rule ore lies close to the east or hangiug wall, and that part of the ledge hss always heen most favored with discoveries. The prcject seems to possess some very encouraging possihilities, and if it provee successful, as is most eincerely hoped it will, it will pave the way to a greater extension of mining operations aud another era of local proeperity.

The east crosscnt on the north houndary line of Best & Belcher on the 900 level is out ahont 20 feet and is at present in soft porphyry. Since the Rule project has heen put nnder way this part of Best & Belcher has been an interesting quarter to the public. Should a hody of ore he found in the southern part of Con. Virginia ground, as a result of the Rule operations, a big impetue would be given to explorations in this portion of the Best & Belcher. There is much virgin ground here and a discovery of magnitude is entirely within the bounds of reason.

Some ore going nearly $35 per ton is heing taken out of the winze from the 1300 level of the Hale & Norcross. A small amonnt of ore going over $42 per ton is heing taken from the ledge ahove the 400 level of the Occidental. The Savage weekly prodnct of bullion reached $4271.40 last week—nearly a thousand dollars above the previone week. The average valne of the ore and the quantity milled were both greater.

Market Reports.

The Markets.

SAN FRANCISCO, NOV. 23, 1893.

The course of the silver market during the week has been a little uneven, hut no changes of consequence have occurred. There was a decidedly firmer tone toward the close of last week, hut Monday the New York price had dropped one cent. The market has since nearly recovered lost ground.

Silver Under the Sherman Law.

Director Preston of the Mint has prepared a statement showing the amount and cost of the silver purchased under the act of July 14, 1890. From the date the act went into effect, Aug. 31, 1890, to the date of its repeal, November 2, 1893, 168,674,590 fine ounces were bought, costing $155,930,940, the average cost per ounce being $0.9244. Of the amount purchased $36,087,285 worth was coined into standard silver dollars, leaving 140,699,760 ounces on hand. This amount will coin $181,915,000.

Exports of Quicksilver.

During the past ten months 6450 flasks of quicksilver went to New York alone hy sea, this quantity being only 298 flasks less than the total exports for the same period in 1892. Mexico, Australia and Central America are also running ahead this year.

On Tuesday the steamer China took 1300 flasks for Hongkong. One thousand flasks were manifested at $30 per flask (reported to be old metal) and the other 300 at $40. These are the first shipments from here to Hongkong since 1890.

The Metals.

Copper has advanced and is now in firmer tone. Lead has likewise gone up a little, yesterday's quotation being $3.40.

Silver and the Metals.

NEW YORK, Nov. 23.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.	Copper.	Lead.	Tin.
Thursday	32¼	69¼	....	3 40	20 40
Friday	32¾	70	....	....	.....
Saturday	32¾	70¼	9 65	3 35	20 60
Monday	32¼	69¼	9 65	3 35	20 60
Tuesday	32¼	69¼	9 60	3 37½	20 65
Wednesday	32¼	69½	9 80	3 40	20 85

San Francisco Metal and Coal Market.

ANTIMONY.		QUICKSILVER.	
Per lb	— @ 13	Home trade, pr. flask	40 50 @41 00
BORAX.		STEEL.	
Refined, in car lots	— @ 7¾	English, lb	— @ 18
Powdered, do	— @ 7¾	Canton tool	— @ 8¼
Concentrat'd, do	— @ 6¾	Sl'k Diam'd tool	8¼@ 15
All grades jobbing at advance.		Pick & Hammer	6½@ 10
COPPER.		Machinery	4 @ 5
Bolt	23 @ —	Toe Calk	— @ 4½
Sheathing	23 @ —	PIG TIN	
Ingot, jobbing	— @ 20	Spot ℔ lb	21½@ 22
Do, wholesale	15 @ 16	COAL.	
IRON.		SPOT FROM YARD—PER TON.	
Bar, base	— @ 2½	Wellington	$8 00
Norway, base	— @ 4½	Greta	7 50
PIG IRON.	Spot.	Nanaimo	6 50
Eglinton ℔ ton	— @ —	Gilman	6 00
Glengarnock	27 00 @ —	Seattle	6 50
Am. Soft, No. 1	25 00@ —	Coos Bay	5 50
Shotts No 1	27 00@ —	Cannel	9 00
Puget Sound	— @ —	Egg, hard	12 00
Clay Lane White	30 00@ —	Wallsend	7 25
Langloan	27 00@ —	Scotch Splint	8 00
Bartherrie	27 00@ —	Brymbo	7 50
Barrow	— @ —	West Hartley	7 50
Dargofleet	— @ —	TO LOAD—PER TON.	
LEAD.		Australian	6 50@ —
Pig	— @ 4½	Liverpool Steam	8 87@ —
Bar	— @ 5	Scotch Splint	7 00@ —
Sheet	— @ 6	Cardiff	7 00@ —
Pipe	— @ 5½	Lehigh Lump	10 00@ —
SHOT.		Cumberland	8 50@ —
Drop, sizes *smaller* than B, ℔ bag of 25 lbs	$1 75	Egg, hard	9 00@ —
Do do, B and *larger* sizes ℔ bag of 25 lbs	2 00	West Hartley	7 50@ —
Buck, Balls and Chilled do, ℔ bag of 25 lbs	2 00	COKE.	
		English, to load	$9 50@10 00
		Do, spot, in bulk	— @12 00
		Do, in sacks	— @14 00
		Cumberland	9 50@ —

Mining Share Market.

SAN FRANCISCO, Nov. 23, 1893.

Toward the close of last week there was a decided falling off in the recent activity in mining stocks; hut there was a renewal of speculation with the present week. The market opened strong and active Monday, and prices showed a continuous advance. No particular stock was the favorite, hut the whole market showed a healthy advance. The weekly reports did not exhibit any particular change.

In the Pacific Board there was a desire to sell hy the leading members, hut on the 9:30 A. M. call of the hig Board the huying orders of Marks, Paxton and Epstein gave a different aspect to the market. Con. Cal. & Va. sold at $3.60; Ophir $1.60; Curry $1.15; Best & Belcher $2.30; and Savage 95c. These figures were changed for the better on subsequent calls, and there was quite a hoom in the closing prices, which showed another advance all along the line.

Local hears who shorted Con. California & Virginia at $3.55 Monday saw it touch $4.75 Tuesday, and they also saw Best & Belcher, which they had sold at $2.25, reach $3.30, and had to face a proportionate increase in the prices of other stocks which they are short upon. They had done their best to keep the market down, hut finally many of the short sellers were forced to fill. Toward noon the extremely high prices to which the shorts had carried the market gave way to a lower range of quotations.

Wednesday the Comstock market opened with quiet strength and was well sustained, with small fluctuations, up to noon. During the morning, Consolidated California & Virginia rose to $4.65, against $4.35 at Tuesday's close, and Best & Belcher, Ophir and all the other favorite stocks held up firmly. The working force in many of the Comstock mines will soon be increased. It is understood that operations at the old Alpha Con. shaft will soon be resumed. This will impart more activity to operations in the middle mines.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING NOV. 14, 1893.

503,860.—FRUIT-WASHER—D. E. Barton, Los Angeles, Cal.

503,408.—FRUIT BASKET—Thos. Cogswell, San Diego, Cal.

508,599.—HOISTING BUCKET—Thos. Cogswell, San Diego, Cal.

508,816.—LADDER—L. D. Craig, S. F.

508,819.—ICE-CUTTER—Leo Datt, Seattle, Wash.

508,417.—PENCIL—A. M. Cruhbs, Forest Grove, Or.

508,473.—GAME TIME CHECK—C. B. Hopkins, Spokane, Wash.

503,618.—OAR-ENGINE IGNITER—O. E Hoyt, S. F.

508,477.—OIL-CAN LOCK—C. H. James, S. F.

508,834.—GAME—W. D. Pickens, Portland, Or.

508,779.—CAR COUPLING—F. A. Stevens, Sacramento. Cal.

508,464.—CALENDAR—H. L. Wead, Spokane, Wash.

508,792.—SEPARATOR—Wheelan & Jessup, Santa Barbara, Cal.

508,589.—EARTH CARRIER—J. J. Wishard, Watsonville, Cal.

22,911.—DESIGN FOR LAMP STOVE—J. F. Myers, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained throngh Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

BEAM OR GIRDER SUPPORT.—Francesco Cavallero, of San Jose, Cal. No. 508,280. Dated Nov. 7, 1893. This invention relates to a device for snpporting the ends of beams or girders which abnt against the sides of other beams or girders at an angle thereto. It consists of a plate or snpport adapted to fit npon the snpporting beam and be bolted thereto, and having a projecting socket-piece extending therefrom at any desired angle, and adapted to receive the end of the abntting girder which is to be snpported thereby, and at the same time retaining the npper snrfaces of horizontal girders flnsh with each other. Roof girders are snpported in the same manner at any desired angle with the snpporting beam. The device is so constructed that it may be attached to beams already in place and propsrly secnred, thereto.

CAR COUPLING.—Fred A. Stevens, Sacramento, Cal. No. 508,779. Dated Nov. 14, 1893. The object of this invention is to provide an antomatic conpling for cars in which the parts of the conpling are prevented from separating accidentally. The draft, when the two parts of the conpling are engaged, is in a direct line with a tendency to hold the parts of the conpling close together. Esch conpling comprises bnt three pieces which are ready to be pnt together withont any tool work or finishing. The conplings are constructed with a head or extension on the top and bottom of the chamber so as to prevent their being lifted above or dropped below the other conpling so far as to disengage while allowing all necessary vertical movement. It also serves to hold the conpling and draw-bar and prevent its falling to the grond in case it is pnlled ont of the car hy accident. The two parts are readily disengaged at any time, and the conpling is exceedingly simple, strong, and easy to make with little or no likelihood of its getting ont of repair.

PRESERVING PILES.—James Cass, Cayucos Landing, Cal. No. 508,279. Dated Nov. 7, 1893. This invention relates to the art of preserving piles and other submerged wooden strnctnres to prevent the ravages of marine worms and insects. It consists of first stripping the bark from the pile, then coating it with a snitable wsterproof componnd, preferably of a poisonons nature, then covering this componnd with a layer of ship's felt or similar material, over this a layer of sheet lead, and finally a series of vertically disposed battens secured by hoops or in other snitable manner. This protection extends from a point below the mnd in which the pile is driven to a point above the water, and will prevent the insects from attacking the pile or other structure.

SEPARATOR.—Fairfax H. Wheelan of Santa Barbara and Robert W. Jessnp of Los Angeles, California. No. 508,792. Dated Nov. 14, 1893. The object of this machine is to separate the different particles of material according to the difference in their thickness and, incidentally, according to their ronghness. It is especially applicable to the cleaning of Lima beans and other seeds, by the separation therefrom of particles of dirt and seeds which differ from the heans and seeds to be saved, both in thickness and ronghness. The machine consists of a vertically rotating disk, a gnide-board set at an angle to the plane of the disk and on its nprising side, said board having its lower edge separated from the face of the disk, providing a discharge aperture, and a feeding device for snpplying the material to be separated to the guideboard. The effect of this arrangement is as follows: On acconnt of the lateral inclination of the board, the beans, seeds or other thin material to be saved are tnrned np edgewise and, heing thin, will pass down throngh the opening between the lower edge of the board and the side of the disk; bnt the material to be discarded, snch as dirt and other foreign matters, or other seeds which differ essentially in shape from the seeds to be saved, will not pass down throngh the opening, bnt will, hy contact with the nprising face of the continnonsly rotating disk, be gradnally worked off along the length of the board nntil they reach the lower end and are discharged.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS

ASSESSMENTS.

COMPANY AND LOCATION.	No.	AMT.	LEVIED.	DELINQ'T	AND SALE.	SECRETARY.
Alta S M Co, Nevada	44	10c	Nov 10,	Jan 4,	Jan 23	J E Jacobus, 309 Montgomery
Belcher S M Co, Nevada	47	20c	Nov 3,	Dec 7,	Dec 23	O L Perkins, Mills Building
Best & Belcher M Co, Nev	55	25c	Nov 1,	Dec 5,	Dec 22	L Osborn, Nevada Block
Butte Belle G M Co, California	1	8c	Oct 11,	Nov 15,	Dec 6	Chas H Ford, Crocker Building
Challenge Cons M Co, Nevada	15	5c	Oct 10,	Nov 14,	Dec 5	C L McCoy, Mills Building
Chollar M Co, Nevada	36	10c	Oct 9,	Nov 14,	Dec 7	Chas E Elliot, 309 Montgomery
Con Wyoming G M Co, Nev	3	5c	Oct 3,	Nov 13,	Dec 2	W J Gurnett, 308 Pine
El Leopoldo G & S M Co, Mexico	4	1c	Oct 26,	Dec 1,	Dec 18	Jabez Howes, 214 Pine
Evening Star M Co, Cal	11	4c	Oct 11,	Nov 13,	Nov 29	J J Scoville, 320 Sansome
Gould & Curry S M Co, Nev	72	10c	Oct 14,	Nov 16,	Dec 7	Alfred K Durbrow, Nevada Block
Granite Hill M & D Co	1	10c	Oct 10,	Nov 14,	Nov 27	J M Wiley, Grass Valley
Gray Eagle M Co, Cal	34	5c	Oct 11,	Nov 23,	Dec 19	Chas C Harvey, 309 Montgomery
Hudson Bay Cons G M Co, Cal	1	10c	Oct 4,	Nov 11,	Nov 30	J H Sayre, 328 Montgomery
Idaho Eureka N W Extension M Co, Cal	1	2c	Oct 14,	Nov 14,	Nov 30	Geo F Nourse, Sacramento
Jack Rabbit M & M Co, Cal	5	3c	Nov 1,	Dec 2,	Dec 22	Chas Wetzel, 320 Sansome
Julia Cons M Co, Nevada	25	5c	Oct 23,	Nov 23,	Dec 19	J Stadfield, 309 Montgomery
Kentuck Cons M Co, Nevada	7	10c	Oct 5,	Nov 9,	Nov 30	Aug Waterman, 309 Montgomery
La Grange Ditch & Hy M Co, Cal	9	25c	Nov 10,	Dec 18,	Jan 8	A Halsey, 328 Montgomery
Martin White S M Co, Nevada	29	25c	Aug 31,	Oct 26,	Dec 14	K L Ross, 120 Sutter
Occidental Coos M Co, Nevada	14	10c	Oct 9,	Nov 13,	Dec 4	Alfred K Durbrow, Nevada Block
Overman S M Co, Nevada	93	10c	Nov 10,	Dec 14,	Jan 4	Geo D Edwards, 414 California
Potosi M Co, Nevada	40	25c	Nov 13,	Dec 15,	Jan 4	Chas E Elliot, 309 Montgomery
St John Quartz M Co	8	5c	Oct 14,	Nov 15,	Dec 2	J M Wiley, Grass Valley
Teresa Mining Co, Mexico	12	10c	Oct 27,	Dec 7,	Dec 23	K J Willats, Flood B'ld'g
Union Con S M Co, Nev	48	20c	Oct 3,	Nov 8,	Nov 29	Chas E Harvey, 309 Montgomery
Yellow Jacket S M Co, Nev	56	25c	Nov 16,	Dec 21,	Jan 27	W H Blauvelt, Mills Bldg

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE
Jupiter Gravel M & W Co	Annual	W A Keefer, 14 Grant Av.	Dec 4
McGlew Ore Concentrator Co, Cal	Special	Frank Sarrere, 116 Davis	Nov 25
Mexican G & S M Co	Annual	Chas E Elliott, 309 Montgomery	Dec 5
San Vicente M Co	Special	A H Ricketts, Crocker Bldg	Dec 6
Union W L M & M Co	Annual	W A Keefer, 14 Grant Av	Dec 4

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, November 23, 1893.

9:30 A. M. SESSION.

50 Alpha	20c	100 G & O	1.45
200 Alta	20c	100	1.50
100 Andes	75c	850 H & N	1.00
600 Belcher	1.05	500 Kentuck	25c
350 B & B	3.15	400 Mexican	1.35
10	3.20	100	1.30
100 Bullion	85c	400 Ophir	2.30
100 Caledonia	20c	500 Overman	50c
100	25c	200 Potosi	1.20
150 Chollar	90c	200 Savage	1.20
100 Con. Cal. & Va	4.65	300	1.25
25	4.60	250 Sierra Nevada	1.50
400	4.70	950	1.65
100 Challenge	1.15	800 Seg Belcher	25c
100	1.10	650 Union	1.20
50 Confidence	2.00	200 Utah	20c
50	2.10	540 Yellow Jacket	1.65
400 Con New York	15c	1000	1.70
200 Crown Point	1.10	950	1.60
650	1.05		

2:30 P. M. SESSION.

1000 Alta	20c	450 Kentuck	25c
1200 Belcher	1.10	100 Mexican	1.35
350	1.05	100	1.30
500 Best & Belcher	3.20	300 N B L	5c
50 Bodie	35c	100 Occidental	30c
100 Bullion	55c	400 Ophir	2.15
200 Challenge	1.00	400 Overman	55c
200	95c	400 Potosi	1.25
250 Chollar	95c	300 Seg Belcher	25c
350 Con. Cal. & Va	4.70	200 S Nev	1.65
100 Confidence	2.05	20	1.50
550 Crown Point	1.10	500 Union	1.20
300 Gould & Curry	1.45	750 Y Jacket	1.55
700 H & N	1.10		

Cal. Debris Commission Notices.

NOTICE—THE CALIFORNIA DEBRIS COMMISSION having received petitions to mine by the hydraulic process from John Spaulding, in the Polar Star mine near Dutch Flat, and to deposit tailings behind a dam in Little Bear River; from Nathan Gardiner in the Red Hill mine near Ono, Shasta Co., and deposit tailings behind dams in Wash Pan Gulch; from A. Denmire, in the Denmire mine near Cold Lake, Sierra Co., to deposit tailings in an old hydraulic pit, gives notice that a meeting will be held at the office of the Commission, room 92, Flood Building, San Francisco, on December 12th, 1893, at 1:30 P. M. On or before this hour and date all parties interested may file affidavits, plans and maps, in support of their respective claims. By order of the Commission. W. H. Heuer, Corps of Engineers, U. S. A., Secretary of the Commission.

Assessment Notices.

GOULD AND CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Trustees held on the fourteenth day of October, 1893, an assessment (No. 72) of Ten Cents (10c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the company, Room 69, Nevada Block, 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 16th day of November, 1893, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on THURSDAY, the 7th day of December, 1893, to pay the delinquent assessment, together with the cost of advertising and expenses of sale. By order of the Board of Trustees.

ALFRED K. DURBROW, Secretary.

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Notice is hereby given that at a meeting of the Directors, held on the 22d of November, 1893, an assessment of $2 per share was levied upon the capital stock of the Corporation, payable at the office of the company, to the Secretery, on the 22d day of December, 1893.

Any stock upon which this assessment shall remain unpaid on the 22d day of December, 1893, will be delinquent and advertised for sale at public anction, and unless payment is made before will be sold Monday, the 8th day of January, 1894, at the office of the company, at 1 o'clock P. M. of said date, to pay the delinquent assessment, together with the cost of advertising and expenses of sale.

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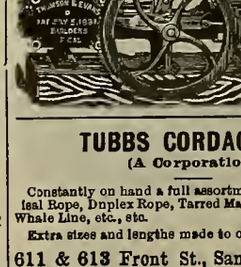

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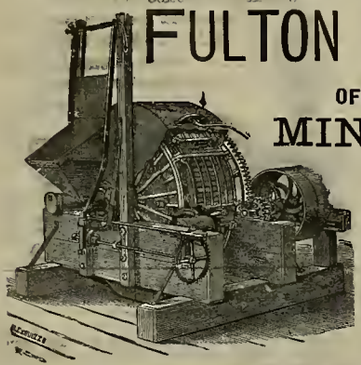

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Two Curious Formations.

Extract from Report of W. H. Storms, Assistant in the Field, in Eleventh Report of State Mineralogist.

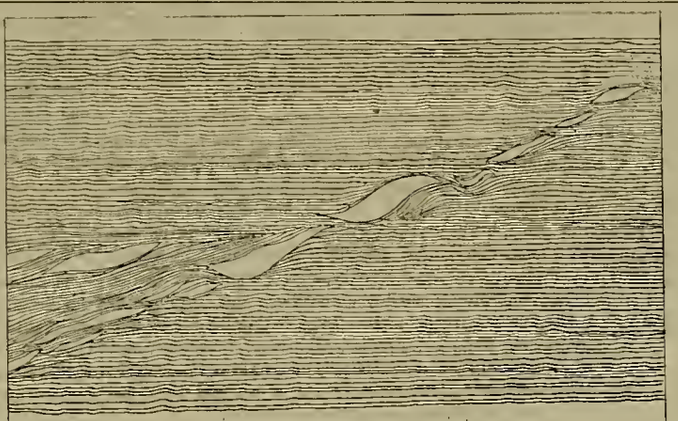
The Helvetia, like other mines near Julian, San Diego county, occurs in the crystaline schists, the quartz heing found as lenses inclosed in the conntry rock. Some of the lenses might be mistaken for fissnres, bnt I failed to see one possessing the charaeteristics of a "fissure."

Nearly all the lenses exhihit a tendency to "make" into the hanging wall side of the country rock, the lenses of qnartz following each other in a generaï direction, hut at an angle with the stratification of the schists, and are separate and distinct from each other, being separated at the ends (where they sometimes overlap) by the "leaves," as they may be termed, of the schistose country rock. These lenses were doubtless caused by a compressive stress on the schists, which had a tendency to split them, hut was not powerfnl enongh to cause an ahrupt fracture. The accompanying sketch may convey an idea of the occurrence of these qnartz lenses.

By the accompanying sketch it will be observed that there is a tendency on the part of the quartz lenses to follow a given direction, which lies at a small angle across the strike of the schists, and that these lenses are not connected, hut occur independently, though all are the result of the same force which flexed and split the strata.

The Ready Relief, near Banner, has several levels, all of which are connected hy winzes and shafts. The huge hunches of qnartz have, from their peculiar form, heen denominated "rolls," and I know of no hetter term which wonld convey a clear idea of their appearance. As a result of close observation made at numerous points in the mine and on the surface at the time of my visit, I formed the conclusion that the "rolls" of the Ready Relief mine simply represent an exaggerated condition of the same sort of flexing of the schists that has produced the other mines of this district. The facts as observed lead me to the belief that the "rolls" or folds of the Ready Relief mine, and its extensions, both north and south, are the result of a severe compressive stress upon the schists at right angle to a line running nearly northwest and southeast; that this force was exerted in the form of pressure and not of contraction; that as a result of this pressure there is a tendency exhihited on the part of the contorted strata to form a reverse fault and not a normal one, and that this power expended itself hefore the rocks were forced to yield to the strain to the extent of fracture, the result heing an abrnpt crumpling of the schists without disruption.

Along this line of disturhance percolating waters have deposited silica in enormous quantities. The schistose folded masses having heen completely metamorphosed, massive quartz replacing the crushed and crumpled crystalline rocks, though the lines of its former schistose structure are in many places preserved.



LENTICULAR QUARTZ BODIES IN SCHISTOSE ROCK

REMARKABLE VEIN FORMATION
READY RELIEF MINE
AT BANNER SAN DIEGO CO.

A sketch of a characteristic section is here reproduced, and it may help the reader to form some conception of this unusual occurrence of gold-bearing quartz. The strike of the country rock is about northwest and southeast, and varies hut little from this over a wide area. The rock is, generally speaking, a dark gray, rather close-grained, micaceous rock (argillite), having a dip to the east of about 80 degrees. The succession of folds cut across the dip of the schists at an angle of about 45 degrees from the horizon.

It will he noticed that in places several of the rolls lie side hy side. Where this occurs the pay shoot is very large. The thickness of the individual rolls varies from a few inches to 5 or 6 feet, and where the folds parallel each other a width of 12 to 20 feet or more is not uncommon. These rolls do not extend longitudinally a great distance, hut seem to gradually diminish, heing followed hy others along the strike of the vein. It seems quite evident that had the stress which produced this folding or crumpling of the schists proceeded much farther an abrupt fracture must have resulted, and the Ready Relief vein would have heen a fissure having a dip of ahout 45 degrees.

IT IS INTERESTING to learn, from a statement hy Senator Perkins, that it was the purpose of Congress in its passage of the hill suspending assessment work on mining claims for 1893, to exclude non-residents from its benefits; in other words, that none other than *bona fide* residents of the States or Territories within which their several mining claims were situated would he favorahly affected hy the Act. Senator Perkins last Tuesday morning notified the MINING AND SCIENTIFIC PRESS that a provision to that effect had been agreed upon in conference between the House and Senate, and that it must therefore have heen incorporated in the hill. He was persuaded that the copy of the law he, as well as Representative Bell of Colorado, had furnished this paper, was incomplete. It was almost incredible that such an error had occurred, hut the senator's recollection ahout the amendment was distinct. Tuesday afternoon, however, the senator received from his secretary in Washington an official copy of the Act, the text of which was exactly as heretofore published. The matter is thus definitely set at rest. The official record of course stands.

LETTERS continue to arrive from South African immigrants declaring that no more grievous error can be made than to leave America at this time for either the Transvaal or Kimberly. Skilled mining engineers and a limited number of experienced amalgamators and millmen get good pay in the Transvaal, but the ordinary miner has an infinitely better chance in California. This class of lahor in South Africa is almost exclusively performed by hlacks. They will not be supplanted hy white labor.

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San Francisco, December 2, 1893.

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THE Eastern press does not seem prepared to realize the extraordinary efforts being put forward to complete the buildings at the Midwinter Fair site. For instance, our valued contemporary, the *Engineering and Mining Journal*, of November 18th, contains the following inadequate notice:

Contracts have been let for two of the buildings for this exposition at San Francisco, and the site is now being graded ready to begin work. The main building will be 450 by 200 feet, and the Mechanical Arts Building 275 by 175 feet. A tower 266 feet high is to be erected on the grounds. Many exhibits have already been promised, including a fine electrical display. The mining interests of the State of California are also making preparations for a large exhibit.

At the time the foregoing paragraph was written the contracts for all the great buildings were let, and work was advancing rapidly on them and a large number of others. The first large buildings have been for many days under cover. Work has been going forward for weeks on a large number of smaller buildings. There are something like seventy, completed, under way or projected, today. There will doubtless be more to-morrow.

THE Parrot copper mine at Butte, Mont., has again started up, and a continuous run for the winter is assured. It is reliably stated that the principal reason for starting up is that the Anaconda company has contracted with the Parrot company for the refining of 1000 tons of copper matte per month for a period that extends over six months. As this would not be sufficient to keep the smelter going all the time, the Parrot people concluded to work in their own ore in the meantime. It is said also that the Moscow and Virginius mines will again open up. The Parrot mine produced in 1892 over 12,000,000 pounds of fine copper.

THE following interesting statement is made in the monthly report of James Lewis & Sons of Liverpool:

"A statement issued by the Boston & Montana Company gives the excess of liabilities over assets on the 30th of June as $450,519, which was converted into an excess of assets over liabilities on the 30th of September of $205,345."

In other words, notwithstanding the great depression in copper, one Montana producer in three months turned a deficit of $450,519 to a surplus of $205,845. This gratifying result is a tribute to the value of the Boston & Montana property and to its management.

AN interesting case has just been decided by Superior Judge Ellsworth of Alameda county. The heirs of Egbert Judson and J. L. N. Shepherd were given a judgment of $40,168 against the Giant Powder company, arising out of the great powder explosion in July, 1892. Shepherd & Judson were conducting the business of their own near the powder magazine, and their buildings were entirely obliterated by the explosion. They asked $80,000 damages. The legal battle was hard fought. The case will be appealed.

ANGELS, Calaveras county, now claims a population of 2500.

The Proposed Tariff.

The tariff bill prepared by the Ways and Means Committee of the House of Representatives has been reported. It makes many sweeping changes in the present tariff, substituting ad valorem for specific duties wherever practicable, and reducing existing rates in a vast number of cases. It is altogether the most radical tariff for revenue means proposed in recent years. It affects every branch of industry, mining in many important particulars. It was expected that lead-silver ores were to be added to the free list, but a remnant of duty is still retained. The provision is as follows:

Lead ore and dross, 15 per cent upon the lead contained therein, according to assay at the port of entry; provided, all ores containing silver and lead in which the value of the silver shall be greater than the value of lead shall be considered silver ores.

Lead in pigs and bars, molten and old refuse lead run into blocks and bars, and old scrap lead, fit only to be manufactured, 1 cent a pound.

It will be seen that instead of a specific duty on lead ores containing more lead than silver, 15 per cent upon the lead contained therein is imposed. The duty is now 1½ cents per pound. The value of lead is about 3½ cents, and the present duty is really over 40 per cent. The reduction is therefore 25 per cent. The duty on pig lead, etc., is now 3 cents per pound. It is to be made 1 cent, a 50 per cent reduction.

In addition to the above, copper ores, old copper, clippings from new copper, all compositions in which copper is the chief component of value, regulus and black copper and copper cement, copper plates, bars, ingots, pigs and other forms; sublimated iron ore, including magniferous iron dross, burnt pyrites, sulphur or pyrites in natural state, mica and crude metallic minerals and unwrought metals, ochre and ochery earths, sienna and sienna earths, umber and umber earths, quicksilver, salt, sulphate of soda, or salt cake or nitrate cake, burrstone bound into millstones, freestone, granite, sandstone, limestone, and other building or monumental material except marble undressed, coal—bituminous, block or cut, and coke, are all on the free list, beginning March 1st next.

It is a matter of conjecture only in what shape this bill will pass Congress, if it passes at all. No doubt it will be severely attacked, not only by Republicans but, in various particulars, by members of the dominant party whose interests it affects.

The proposed tariff will, it is feared, have a disastrous effect upon the quicksilver industry. The present duty is $7.65 per flask, and the price of quicksilver is $40.50, making the ad valorem tariff over 15 per cent. With the mines of California working extremely low-grade ore (the New Almaden as low as 1.2 per cent) the margin of profit at present prices is very slight where it exists at all. During 1892 the average San Francisco price of quicksilver was $38.80 per flask of 76½ pounds; the average London price was $31.90 (£6 14s), a difference in favor of the United States of $6.80. It seems obvious that if the duty is removed a part of the Spanish output will seek a market in the United States in preference to London. With the shutting down of many silver mines the quicksilver market in the United States has been restricted, and nothing but the diminution of the product has allowed maintenance of prices.

THE Deputy Collector of Customs on the American side of the Kootenai river is reported to have made a singular ruling. Heretofore it has been customary to pass ore through to the smeltere, awaiting the invoice returns before collecting the duty, as it is impossible to ascertain the percentage of lead or the valuation in any other manner. The railroad companies and the smelters being under bond to make accurate returns, and the collection being fully guaranteed, there is no probability of loss by this method. But it is said that the Deputy Collector now insists upon collection in advance, on the basis of 50 per cent lead, and should the smelter returns show a higher percentage the owner must pay duty on the full amount, but in the event of a shipment falling below 50 per cent, the Government, as impersonated by this official, will not return the excess of duty paid.

GOVERNOR WAITE has called a convention of resident miners and mine-owners of certain silver mining towns in Colorado to meet in Salida, December 6th, for the purpose of discussing extra session of the legislature. At that meeting the Governor will present his plan of relief, and then a vote will be taken to decide whether or not an extra session shall be called to act upon the Governor's plan, whatever that may be. This vote will decide the Governor.

THERE is not at present a single mine in operation on the Gogebic range, a region that mined something like ten million tons of iron ore last year. Altogether, about 15,000 people are in a helpless condition. Measures for relief have been devised.

River Protection and Hydraulic Mining.

Senator Ford's Rejoinder to Mr. Ohleyer.

[Mr. George Ohleyer recently contributed to the Sacramento *Bee* a reply to Senator Ford's article on "River Protection and Hydraulic Mining," which appeared in the MINING AND SCIENTIFIC PRESS November 4, 1893. The substance of Mr. Ohleyer's paper is that Mr. Ford is a lawyer and his argument entitled to be considered only as a lawyer's brief; that commerce does not need the gold contained in the gravel beds; that no other factor except hydraulic mining has contributed to detritus in the streams; that non-hydraulic streams remain the same as before the advent of the monitor; and that hydraulic mining is a beast and monster, anyway. The salient points of Mr. Ohleyer's arguments are stated clearly and fairly in Senator Ford's reply which follows.]

Those who have not followed the subject of river protection and hydraulic mining through its varying phases have not always understood upon what ground the Federal Government is asked to appropriate money for the construction of works to restrain and impound mountain debris. In answer to inquiries in this regard the undersigned recently contributed an article to the MINING AND SCIENTIFIC PRESS, wherein it was attempted to enumerate some of the known causes that had led to the filling up of our navigable streams, and to point out the plan adopted by both Congress and our State Legislature for preserving our rivers without injury to either the farming or the mining interests. As premises, two propositions were laid down which the writer supposed would be universally conceded. They were thus stated:

"It goes without saying that the navigable streams of California must be protected. It is also true that commerce needs the millions of gold now locked up in the hydraulic gravel beds in the Sierra Nevada mountains."

The writer, therefore, confesses to some surprise that the second of the above propositions should be combated by so able and intelligent a writer as the Hon. George Ohleyer of Sutter county. In the Sacramento *Bee* of Nov. 18th Mr. Ohleyer criticises at considerable length the article in the MINING AND SCIENTIFIC PRESS, above referred to, and, among other things, says, with reference to the proposition that commerce needs the millions of gold now locked up in the hydraulic gravel beds:

"It is not clear that commerce needs the asserted millions to be washed out by the hydraulic process. The commerce of the world has always been supposed to be based on agriculture, and never on mining for the precious metals. The gold taken from the gravel beds of California and Australia may have quickened the trade of the antipodes, but, true to history, both ancient and modern, it left the countries impoverished, and, where preserved, it was by agriculture and the commerce it engendered."

With all due respect to the learning and ability of Mr. Ohleyer, it is submitted that the commerce of California would at least be "quickened" by the addition of a few millions of gold to our circulating medium. The writer is willing to leave this branch of the question to the business men of Sacramento and Marysville, with the belief that their judgment as to the "quickening" influence of gold is of far more value than that of the writer.

Mr. Ohleyer next criticizes the writer's statement concerning the effect of artificial banks or levees upon our navigable streams. His argument seems to be that the levees do not in any degree contribute to the filling up of the rivers with debris washed down from the mountains, but that hydraulic mining is solely responsible therefor. In fact he says that "the channels of the non-hydraulic streams remain practically the same as before the advent of the monitor, nature never having overburdened them." Let us see if Mr. Ohleyer is really correct in his views. That portion of the Sacramento river above the town of Colusa is certainly a "non-hydraulic" stream; yet, as a matter of fact, there is nowhere a better illustration of the very effects suggested in the article complained of than in this same "non-hydraulic" stream. In the Sacramento weekly *Bee* of Nov. 15th is a most interesting and scientific article from the pen of one of the most gifted writers on the Pacific Coast and one of the most ardent advocates of river protection in California. Mr. Will S. Green is the author, and there is probably not another man living so thoroughly acquainted with the upper Sacramento and its tributaries and adjacent lands. Mr. Green's article is devoted to a discussion of river protection and low-land drainage, and, in the course of the article, he says:

We are leveeing a gravel-carrying stream. *This is the most important factor in the problem.* A stream which carries gravel and coarse sand is necessarily a fast builder of land. Down to Colusa the river has vibrated between hard-pan banks that average about a mile and a half apart. The levees have been built on these hard-pan banks. Between the levees there are low bushy bends or sand-bars. The levees have grown—mostly since 1862—and the line of the high water at Colusa has been raised between six and seven feet, *and the low bends, that have been reservoirs for the deposit of coarse material, are now, in many places, higher than the banks that did not overflow in 1862, the great high water year. Stick a pin here, and we will come back to it presently.*

Further along in his article Mr. Green says:

Now, let us go back to our pin. As I have said, a stream that carries coarse material must, of necessity, be a fast builder of land. *The rapid filling in of the bends between the levees above Colusa proves we must do something with this material.* It must go to the building

up of land, and we must make our outlet with that in view. [Mr. Green refers to artificial outlets from the river into a drainage canal through the low lands between the river and the foothills.] There must be frequent outlets into the main canal from the upper river, and they must be wide. They will fill up, and must be moved, so there will be a perfect system of land-building that will go on indefinitely. [The italics are ours.]

Thus it seems that even in "non-hydraulic" streams the mountain debris will find lodgment between the artificial banks or levees, necessitating constant additions to them, as suggested in the article complained of. Napa creek, Stony creek and numerous other streams might be cited in illustration of the work of "non-hydraulic" streams in bringing debris down from the mountains. The fact is as stated in the article in the MINING AND SCIENTIFIC PRESS: "The work of depositing detritus from the mountains and foothills in the valley streams and upon adjacent lands began centuries before hydraulic mining became a recognized industry, and unless checked by the application of appropriate means, under governmental direction and authority, will continue for centuries after the last gravel-bed has disappeared from the auriferous regions of California." The building of levees has not lessened the flow of detritus from the mountains, but it has confined the material brought down to narrower limits, and, while protecting adjacent lands, has caused the streams to fill up between the levees, which, as Mr. Green well says, "proves we must do something with this material." Engineering experiments have clearly shown what that "something" is that must be done. But of that later on.

Just here a misstatement of Mr. Ohleyer's may be noticed. It is not to be presumed that Mr. Ohleyer intended any misrepresentation, and he will, of course, hasten to acknowledge his error. By reading the article complained of carefully he will readily see that the writer expressed no such opinion as that the construction of levees was a mistake. The statement there made was that the levees cut off all means of escape through sloughs and other natural outlets, and confined the debris-laden waters within the confines of such levees. That was the the statement of a fact that is well known, and the result thereof is clearly stated by Mr. Green. But, in addition to the above statement, the writer was careful to add that "no one would ask for the removal of the restraining levees, notwithstanding their constant tendency to choke up the rivers with accumulated sediment."

It is also to be regretted that Mr. Ohleyer deemed it necessary to fortify his argument by the use of such epithets as "beast" and "monster" in referring to the hydraulic mining industry. Vituperation is not argument, but rather indicates a lack of it, and can serve no other purpose than to keep alive a prejudice that is rapidly dying out, and which, it is hoped, may never again be revived. The people of the valleys and of the mountains have important interests to conserve and important matters to engage their mutual attention, and they cannot afford to waste their time in useless bickerings or profitless quarrels.

Now we come to the real matter in hand, namely, the preservation of our navigable streams without the destruction of established industries; a matter that seems to have entirely escaped the attention of Mr. Ohleyer.

As was stated in the article in the MINING AND SCIENTIFIC PRESS, it is the plain duty of the General Government to protect its navigable waters—a duty fully recognized by the Federal authorities. Nor should the Federal Government be wholly unmindful of those to whom it has sold its public lands. The farmer is entitled to whatever protection the Government can reasonably afford him, and will, of course, reap the benefit of whatever means may be adopted by the Government for the protection of the streams, for the protection of the streams will mean the protection of the adjacent lands; and the hydraulic miner, who purchased his land from the Federal Government, with the full knowledge on the part of the Government that the land thus purchased was to be mined by the hydraulic process, is entitled to some consideration at the hands of those who make and enforce our Federal laws. Much has already been done in this behalf and the State and Federal Governments both stand committed to the same line of action.

Let us note briefly just what has been done, and, in the language of the member from Georgia, ascertain just "where we are at."

First—Engineering experiments have demonstrated that it is practicable to construct restraining works and settling basins that will effectually impound all debris, from whatever cause arising, that could work any material injury to the navigable streams or adjacent lands. Furthermore, the matter has been the direct subject of judicial investigation, and a decree rendered by the United States Circuit Court for the district of California in the case of United States vs. North Bloomfield Mining Company, in October of last year, at San Francisco, determined that not only could such works be constructed, but that one of the largest hydraulic mines in California had in fact constructed works capable of doing all that was necessary for the protection of the rivers and adjacent lands. Upon this point the Court say:

"There are three objections urged against the operation of this impounding reservoir. First, that it does not successfully remove from the water the material which is carried in suspense, and that the water that escapes by the cribs takes with it material which becomes deposited in the lower streams and injuriously affects the navigability of the same."

Concerning this objection the Court say:

"Upon the first of these objections the evidence, although voluminous, is not to any considerable extent conflicting. The water that escapes through the cribs is discolored with very fine particles of comminuted clay which are held in suspense. It is impossible that water that has once fairly come to rest in the pool, and has then been drawn off from the surface through the cribs, should carry with it any sand or anything other than the lightest material. The evidence goes to prove that the fine clay held in suspense in the water, and which causes its discoloration, is of specific gravity very little greater than water, and that it will remain in suspense so long as the water moves with the velocity of a mile in two hours.

"The evidence further shows that this material is carried in a state of suspense through the Yuba, the Feather, and the Sacramento rivers, and into the ocean. It does not appear that at any point on those streams the water comes to rest, or that the clay which it carries is deposited in any appreciable quantity.

"After taking into consideration all of the evidence, I am convinced that after the water which conducts the mining debris shall have once come to rest so as to deposit all the sand and heavier material that is carried in suspense, leaving only the light, flocculent particles of clay, which gives it its color, no material will be subsequently deposited from it unless it is brought to rest, and so remains for a longer period than it has remained at rest in the impounding pool."

The dam referred to in the above decision was built mainly of brush and small trees and was raised gradually as necessity required. The works to be constructed under governmental authority, however, are to be of such material as will insure safety and permanency and are to be constructed under the direct supervision of United States Engineers from the War Department.

Second.—Following the principles laid down by the United States Circuit Court, Congress has mapped out a policy for the protection of the rivers that shall at the same time permit the business of hydraulic mining to be carried on under proper restrictions and limitations. The Caminetti Act, so-called, became a law on the first day of last March, and is now the highest law we have upon the subject of which it treats. This law provided for the creation of a commission to be known as the California Debris Commission, and to consist of three members of the Corps of Engineers of the United States Army. The commission are to grant permission to mine by the hydraulic process under the conditions named in the Act and are to make examinations and surveys with a view to the improvement of the rivers and the preventing of damage to them by debris resulting from mining operations, natural erosions, or other causes. The Act distinctly recognizes "other causes" than hydraulic mining as contributing to the filling up of the rivers. Among other things, the Act in question provides:

"That said Commission, in order that such material as is now, or may hereafter be, lodged in the tributaries of the Sacramento and San Joaquin river systems, resulting from mining operations, natural erosion, or other causes, shall be prevented from injuring the said navigable rivers, or such of the tributaries of either as may be navigable, and the land adjacent thereto, is hereby directed and empowered, when appropriations are made therefor by law, or sufficient money is deposited for that purpose in said debris fund, to build at such points above the head of navigation in said rivers and in the main tributaries thereof, or branches of such tributaries, or at any place adjacent to the same, which in the judgment of said commission will effect said object (the same to be of such material as will insure safety and permanency), restraining or impounding dams or settling reservoirs, with canals, locks, or other works adapted and required to complete the same."

The Commissioners are thus clothed with ample power to protect the rivers and adjacent lands from injury from the flow of mountain debris, whether such debris result from mining or other causes, and only need the funds necessary to enable them to carry this power into execution.

Third—Our own Legislature, at its last session, provided for the appointment of a Debris Commissioner and appropriated $250,000 to be expended under his directions and in conjunction with the work of the United States Engineers, whenever the General Government should appropriate at least as great a sum for similar purposes. Both the Caminetti act and the State act provide that the State and Federal Commissioners shall work in harmony and to the same end, and it only remains for Congress to make the needed appropriation in order to make both acts effective.

Fourth—Not only did our Legislature at its last session provide for the appointment of a Debris Commissioner to act in conjunction with the Federal Commissioners in restraining and impounding the debris that is washed down from the mountains and foothills, and thus prevent its reaching the navigable streams, but the Legislature went further and completed its work by providing for the appointment of a Commissioner of Public Works, whose duties are, in part, thus set forth:

"The Commissioner shall perform such duties in the examination of lands subject to inundation and overflow by flood waters, and of the waters causing and making such inundation and overflow, and in the preparation of plans and estimates of cost for work to regulate and control such flood waters, as he may be directed to perform from time to time by the Governor, etc."

Thus we have a complete, perfect and harmonious system, wherein the State and Federal authorities join hands in the prosecution of a work that cannot result otherwise than beneficially to the commerce of California. The debris washed down from the mountains, from whatever cause arising, will, when necessary, be permanently lodged and impounded behind Government works built along the mountains and foothills where nature has provided an abundance of storage sites of unlimited capacity; the rivers, relieved in part of their ancient burden of debris, will be improved and their carrying capacity augmented; the flood waters will find means of escape through artificial outlets and canals; and the lowlands of the valley will be drained and made to yield their quota to the resources of a great State.

It is too late now to cry halt. The valleys and the mountains have joined hands in a great work and have assurances of aid from both the State and the Nation in carrying that work to a successful conclusion. All interests and all industries will be carefully guarded and protected, and the contentions and prejudices of recent years will melt away before the returning prosperity that will smile over mountain and valley. Improved rivers will bear the burdens of an augmented commerce, while added millions from the mines will "quicken" the trade and life of our commercial centers. Let us, then, hope that the voice of the pessimist will no more be heard in the land; that no one will be found standing in the way of commercial and industrial progress, but that with one common aim and one common purpose, and regardless of locality or occupation, we may all strive for the upbuilding of every section and every industry of our great and richly-favored State.

TIREY L. FORD.

Foundry Notes.

THREE McGlew concentrators have just been shipped to Madera county, for Spencer & Sharp, at French Gulch.

THE cruiser Olympia has demonstrated that she is a record-breaker. For several days last week and at the beginning of this she was out on her official trial, in Santa Barbara channel, but from a variety of causes (mostly weather) she has been delayed. Last Friday, during a burst of speed, she covered a mile of water at the astonishing rate of 26.12 knots, or over 30 miles per hour. It is believed now that the Olympia will beat the Columbia's average of 22.8 knots for a four-hours' run. The Union Iron Works will no doubt earn a large bonus.

A VERY LARGE centrifugal pump has just been cast at the Byron Jackson foundry. The pump appears to be a prodigious conch shell, with a turbine wheel in it. It stands over 12 feet high. The bed plan occupies a space of about 14x18 feet. It is estimated that the engine will give as much work as a triple-expansion engine of the same horse power, there being no valves and no loss of steam by radiation. The steam connection is direct, and the governor and automatic cocks of the condensing chamber are newly patented. The whole plant shows great strength and solidity. The pump-shell cast weighs about five tons, is seven-eighths of an inch thick and has a capacity of 50,000 gallons per minute through a 44-inch outflow. This is one of two which will be used by the Summit Lake Water Company to pump water for the irrigation of a large area of land in Fresno county.

THE following rules governing the supply of lighting and power are published for the information of exhibitors and concessionaires at the Midwinter Exposition:

All wiring must be suitable for the class of current the exposition is able to furnish. Lamps may be supplied with a current from 100-volt A. C. circuit, 500-volt D. C. circuit lamps in series, and a limited number from 100-volt D. C. circuit.

Information concerning the class of circuit for any location may be obtained from the electrical engineer.

Current for arc lamps will be furnished at the rate of $65 per lamp of 2000 nominal candle-power, from the opening of the exposition, January, to its close, for a period not to exceed six months.

Consumers of light will be charged the actual cost of installation of arc lights and for all breakages. The exposition will furnish carbons and service.

Incandescent-lamp service will be furnished for the period of the exposition at the rate of $8 per 16-candle-power lamp; this is to include the first lamp. Renewals and breakages must be furnished by the consumer. The consumer will furnish all fixtures and shades for the wiring of lamps.

Special agreement must be made for colored or fancy lamps, or lamps of other than 16-candle power. Special discount will be made for service for installations of 50 or more lamps.

Power for motors will be furnished at the following rates for the period of the exposition:

For one-fourth horse-power and less	$15.00
For more than one-fourth horse-power, and not exceeding one-half horse-power	30.00
For more than one-half horse-power, and not exceeding one horse-power	50.00
For more than one horse-power, and not exceeding two horse-power (per horse-power)	45.00
For more than two horse-power, and not exceeding three horse-power (per horse-power)	42.50
For more than three horse-power (per horse-power)	40.00

A limited amount of power may be furnished to exhibitors free of charge to simply turn over otherwise inoperative exhibits, exhibitors to furnish all necessary motors, rheostats, switches, belts, countershafting, wiring, etc., necessary for connecting motors with main wires and operating machinery.

Motors must be suitable for operation of class of circuit furnished in exhibitors' location. All rheostats must be constructed of wholly non-combustible material.

THE activity in gold mining extends to southern California as well as northern. Several Montana miners have recently arrived at Los Angeles, and will engage in a systematic hunt for gold.

Losses of Gold by the Cyanide Process.

Dr. A. Simon of Johannesburg, South Africa, in a lecture on the loss of gold by the cyanide process, related experiments he had made with a view to find out how the loss of gold in treatment by the cyanide process occurred. All knew that there was a great difference between the theoretical and the practical results. The theoretical or assay results showed a certain amount of gold extracted from the tailings they were treating, but the practical results invariably showed a short-fall on this. A certain quantity of gold was lost in treatment, and he had endeavored to find out how this loss came about. He thought that the material used in the plant to a certain extent could account for it, and also for the abnormal loss in cyanide. In order to ascertain this he tested the filtering material first. The various filtering cloths now in use on these fields were subjected, under similar conditions to those in the cyanide works, to cyanide solutions, and the tabulated statement printed below showed the decomposing action of the various filtering cloths on the cyanide solution:

RESULTS OF EXPERIMENTS.

Pure Cyanide.	Ashestos.	Sackiog.	Cocoaoui Mattiog.	Jute.	Time io Hours.
0.5	0.5	0.5	0.5	0.5	0.5
0.5	0.5	0.495	0.49	0.5	2
0.5	0.5	0.49	0.48	0.475	4
0.5	0.495	0.485	0.465	0.49	6
0.5	0.49	0.48	0.45	0.48	8
0.5	0.415	0.47	0.44	0.475	10
0.485	0.45	0.41	0.32	0.44	30

Drawing conclusions from the tabulated statement, the speaker went on to condemn the cocoanut matting, which, he said, was in general use in South Africa at present. He certainly recommended sacking or jute, which were practically the same for filtering purposes, as the most advantageous. These experiments he had made with pure cyanide, but he had also made others with an admixture of cyanate and cyanide. All went to show that cocoanut matting was not advantageous as a filtering material. In one case, the adoption of asbestos was absolutely necessary, and that was in the case of highly acid tailings, and where tailings had been lying in the air for some time. In other cases jute would do. Generally speaking, where the cocoanut matting was employed, there was a greater short-fall in the gold as compared with the theoretical winning. He had also found that wood absorbed the gold to some extent, but this was not the only way in which gold was lost. The short-fall of the gold had never been satisfactorily explained. It could not be in the assays, as these had been very carefully made, and never showed a surplus. Even in cement tanks there had been a short-fall. The absorption only accounted for it in a small measure. He had made successful experiments in order to prevent the absorption by wood. He had painted the inside of the wooden vats with an iron salt, filling the pores with an iron precipitate not acted upon by cyanide, and by this means had to a considerable extent prevented the cyanide solution containing gold from penetrating the wood. The speaker then proposed a more elaborate system of filling up the pores, based on the above principles, by impregnating the wood under pressure with the iron solution.

Book Reviews.

"ORIGINAL PAPERS ON DYNAMO MACHINERY AND ALLIED SOBJECTA," by Jno. Hopkinson. W. J. Johnston Co. and Whittaker & Co., Pnblishers. For sale by Geo. W. Osborn, San Francisco. Price, $1.

Tbis little volnme comprises a series of papers by Mr. Hopkinson. Five relate wholly or in part to the continnous current dynamo. Four are on converters. Lastly, there is a note on the theory of alternate cnrrent machines and a paper on the applications of electricity to ligbthouses. The name of the anthor is a snfficient gnarantee of the thoronghness and valne of the work.

"PARLIAMENTARY TACTICS OR RULES FOR DEBATE," by Harry W. Hoot. By the Scientific Publishing Company, New York. Price, 50 cents.

This is merely an arrangement in handy form of rules in use in parliamentary form. Its chief valne lies in its index.

THE general form of license to mine issued by the Califoruia Debris Commission is coutained in the following permit of the Excelsior mine, Smartsville, Yuba county:

"By virtue of authority conveyed by the Act of Coogress approved March 1, 1893, the California Debris Commission hereby issues a permit to the Excelsior Water & Miniog Compaoy io mioe by the hydraulic process 3 7-100 acres of grouod in the Blue Gravel placer-mioiog claim, situated oear Smartsville, Yuba couoty. A cooditioo of this permit is that the detritus shall be securely stored io ao adjoining pit, subslaotially as stated io the applicatioo of Louis Coorath, attorney-io-fact of the Excelsior Water & Mioing Compaoy, dated September 23, 1893. This licooe is revocable io the discretion of the Califoroia Debris Commission."

A DISPATCH states that the Colorado gold output for 1893 will show an increase of 100 per cent over 1892. The figures for last year were $5,539,021. The increase would therefore be to $11,000,000, which is in the vicinity of Califoruia's average anuual output. We do uot expect to see the claim made good. While there will doubtless be a large iucrease from the gold fields, the gold by-product of the silver mines, which is nearly one-half the total, will show a heavy falling off. Colorado will have done very well if she is able to counterbalance this decrease.

Slickens.

THE White Diamond quartz mine is being opened np at North Bloomfield by local capital.

AT several points along the British Colnmbia frontier Chinese pretend to work in placer mines that they may be smuggled into the United States.

THE *Territorial Enterprise*, at Virginia City, for many years the leading paper of Nevada, after snspension for a year, is to be revived December 3d.

J. B. TREANWELL, the well-known mining engineer, has removed to Nevada City with his family. He will have charge of running the Gold Bsnk tnnnel.

IN reply to an inqniry from Riverside, Cal., the acting Secretary of the Interior has written that the department cannot grant permission to mine on the San Bernardino reservation.

THE Del Norte *Record* says that many of the idle lnmbermen in Del Norte connty intend going into the monntains this winter for the purpose of mining in the nnmerons creeks and canyons.

THE Liveoak and Minnet Mining Company has been incorporated. Principal place of bnsiness, Sau Jose. Capital stock, $500,000, witb A. McMahon, C. H. Clement, Byron Jennings, Giles E. McDongall and C. W. Conlisk of San Jose as directors.

THE Plumas *National-Bulletin* produces in bronze a facsimile of the official ribbon awarded for a collective exhibit of gold, silver, copper and iron ores. The diploma and medal will not come for some montbs yet. The ribbon will be exbibited at the Midwinter Fair.

WORK has been resnmed in the copper mines at White Clond, Nevada, owned by the White Clond Copper Mining Company, of New York City. The property was closed a sbort time ago, owing to the financial panic which was so severe in tbe East. Thirty miners are employed.

TWENTY STAMPS of tbe great 100-stamp mill of tbe Phœnix Mining Company started work Tnesday on the company's property, north of Phœnix, Ariz. Tbe mine has been opened extensively in the last ten months and will take rank as one of Arizona's main bullion prodncers.

THE Good Hope mine in Riverside connty has been sold to a Denver syndicate. It is the pnrnose of the new owners to begin the development of the mine, which heretofore has been worked in a small way. Machinery has been ordered, whicb is expected to be in operation by Jannary 1st.

GOLD discoveries have been made on what is known as Goose creek, in the western part of Colorado, not very far from the town of Sapinero. It is represented that these discoveries are wonderfnl in their richness, and tbat a great boom may be expected in the new camp in a short time.

RECORDER MERDOX of Sierra county has set a good example by having printed blanks giving notice that mining claimants desire to take benefit of tbe snspension act, and intend in good faith to hold and work tbe claim. They are distribnted free. The only expense attached to the miner is the cost of recording.

THE Rio Grande Western Railway is preparing to make an extensive coal and mineral exhibit at the San Francisco Exposition. Last year the coal traffic of this road reached 38 per cent of its total tonnage. This year it will be 50 per cent, and, with the exception of four Pennsylvania lines, it has the largest coal tonnage of any line in tbe United States.

A TELEGRAM reports the Novemher prodnct of tbe Alaska Treadwell mine at Donglas Island, Alaska, at $75,388 in gold. Tbe mill was rnn 29½ days, crusbing 19,170 tons. Tbere were 440 tons concentrations manipnlated, yielding $23,433, which is inclnded in the above total. The ore is low grade, bnt is economically handled, and hence yields fair profit.

THE statement is pnblished tbat the Mercnr Mining and Milling Company is making large profits throngh the workings of the cyanide process at its Utah mill. Tbe mill was pnt in the Mercnr last snmmer, and already two dividends of $25,000 each have been declared by the company, which, besides, have a large snrplns on hand. The Mercnr mine tnrns ont $26,000 net montbly.

SMELTER RETURNS to the cnstom bonse show tbat from Augnst 4th to November 1st inclusive tbe shipments of ore from the Slocan conntry by way of Bonner's Ferry aggregated 1,530,822 ponnds, or a fraction over 765 tons. The invoice valnation was $118,293, an average of $155 to the ton. Tbis is on the basis of 70 cents an onnce for silver. It is estimated that an eqnal amonnt went ont over the Canadian Pacific, bringing the aggregate ontpnt of the Slocan mines up to abont 1500 tons.

THE Occidental Mining company bas elected the following trustees: George R. Wells, Nat T. Messer, H. Zadig, E. B. Holmes and A. S. Wolberry. Mr. Wells was chosen president, and A. K. Durbrow secretary. A stock dividend of share for sbare was declared of the stock remaining in the treasury, npon the payment of 15 cents per sbare upon all assessment paid stock prior to November 27th. A cash balance of $237 was reported. From the 400 level, 10 tons of $39 ore is taken every week.

REPORT of the Harqnr Hala (Arizona) Mining Company for September shows the following: Tons crnshed, 2700; bnllion estimated to yield $32,000; expenses estimated at $10,000; estimated profit for the month, $22,000. Tailings—Samples were taken at intervals and show an average loss of $1.29 per tou. The yield per ton in bullion is eqnal to $11.85; the loss per ton in tailings is eqnal to $1.29; the valne of the ore milled therefore eqnals $13.14. During the latter part of the month the grade of ore fell off.

A NEW VARIETY of silver ore has been bronght from Bolivia, and it has received the distinctive name of canfieldite, says the *Australian Mining Standard*. It is chiefly remarkable for containing abont 6½ per cent of the extremely rare element germaninm, which was discovered by Professor Winkler in 1886, in argyrodite, a donble snlphide of the new element and silver fonnd at Freiberg. Germaninm has hitherto only been discovered in one other mineral; namely, enxemite. It received considerable attention from the fact of its corresponding almost exactly with the missing element ekasilicon, predicted by Mendelejeff, and it has since taken its place in tbe fourth, or tetravalent gronp of the periodic classification, coming in between silicon and tin vertically, and gallinm and arsenic horizontally. Germanium was snspected in the new metal, from the deposition on heating in closed and open tubes, or of charcoal, of a white sublimate of sulphide, as in the case of argyrodite. In fact, the two minerals, in all probability, are merely dimorphous forms of silver germaninm sulphide.

THE Cleveland Consolidated Mining Company held an election of officers in Red Blnff last week and elected the following officers: Pres., R. G. Hart Jr.; Vice-Pres., Jndge J. F. Ellison; Sec'y, Gen. N. P. Chipman. Directors—J. S. Cone, W. M. Hart, R. G. Hart Jr., N. P. Chipman and J. F. Ellison. By the 1st of December the company will have their five-ton chlorinating and roasting plant in operation, says the Sbasta *Democrat*. The furnace is 40 feet long and has four hearths. The brick for the fnrnace was bnrned on the gronnd.

JAMES ("JIM") WARNER, who recently left Fairhaven, Wash., for Sonth Africa, writes back that the fare is as follows: First class—New York to London, via Liverpool, $65; London to Cape Town, raised $200; Cape Town to Johannesbnrg, railroad, $58; total, $323. Second class—New York to London, winter rates, $35; London to Cape Town, raised, $130; Cape Town to Johannesbnrg, $40; total, $205. Third class—New York to London, steerage, $20; London to Cape Town, third class, $82; Cape Town to Johanneshnrg, tbird class, $21; total, $123.

Tin Mining.

The following curious statements about tin-mining are taken from *Symon's Gazeteer* of Cornwall:

The greatest profit derived in one year was from Penstruthal in 1827—£60,000. The greatest loss on any working was at Wheal Vor—£250,000. The greatest patience ever exercised was by the shareholders in Wheal Agar, working 40 years and no profit. The quickest returns ever made was at Par Consols, where the shareholders (except Mr. Treffry) never paid a penny for costs. The greatest quantity of machinery on any mine in the county was at the Clifford Amalgamated. The mine which worked the longest without intermission was Ding Dong, probably 200 years. The oldest and largest open tin work is that of Carclaze, more than 400 years old. Mulberry, in Lanivet, is nearly as large. The family most enriched by mines was that of Mr. Williams of Scorrier. The first man engine erected in Cornwall was at Tresavean, about the year 1835. The first pnmping engine was erected at Wheal Vor in 1747, and the first stamping engine in the same mine in 1815. Sixty years ago there was no such person as a mine broker; now there are hundreds. Then promotion money for mines was unknown. All mining at that time was of a legitimate kind. The most snperficial discovery of metallic mineral was at Perran Wheal Virgin, near Truro, where a lead lode two feet wide was found immediately beneath the turf covering. At Godolphin a rich copper lode was discovered by streamers for tin in cutting a lead. Here are some comparisons: In 1880 the 60 Cornish and Devonshire mines then working produced 13,370 tons of block tin worth £678,706. In 1856 the production in Devon and Cornwall was 9350 tons of tin valued at £663,350; in 1871, 16,272 tons, valued at £1,630,834, from 145 mines; and in 1872, 14,226 tons, valued at £1,246,135, from 162 mines. In 1874 the 230 mines produced 14,039 tons of tin, valued at £788,310. To the above we may add that, while in 1880 there were 60 Cornish mines at work, there are now only 30 in operation.

An Estimate on Mesabi Mining.

It is a somewhat difficult matter at this time to correctly estimate the cost of mining by steam shovels, but one has only to witness the operation of loading ore to become convinced that the cost must be very small. The surface at the Missabe mountain averages abont 20 feet. The ore is known to be 100 feet deep. Its costs from 25 to 40 cents per yard to remove stripping. It costs from 3 to 5 cents per ton to shovel the ore after the stripping is removed.

Supt. Florada was asked by a representative of the *Mesabi Range* if he could give an estimate of the cost of producing the ore at the Missabe mountain. He replied that it was too early in the game to make an accurate estimate, "but," said he, "so far the cost is nearer 60 cents than 40." Other well-posted men believe that it is much less than his lower figure. One of them took out his pencil and figured the cost of producing a ton of Missabe mountain ore on Cleveland as follows:

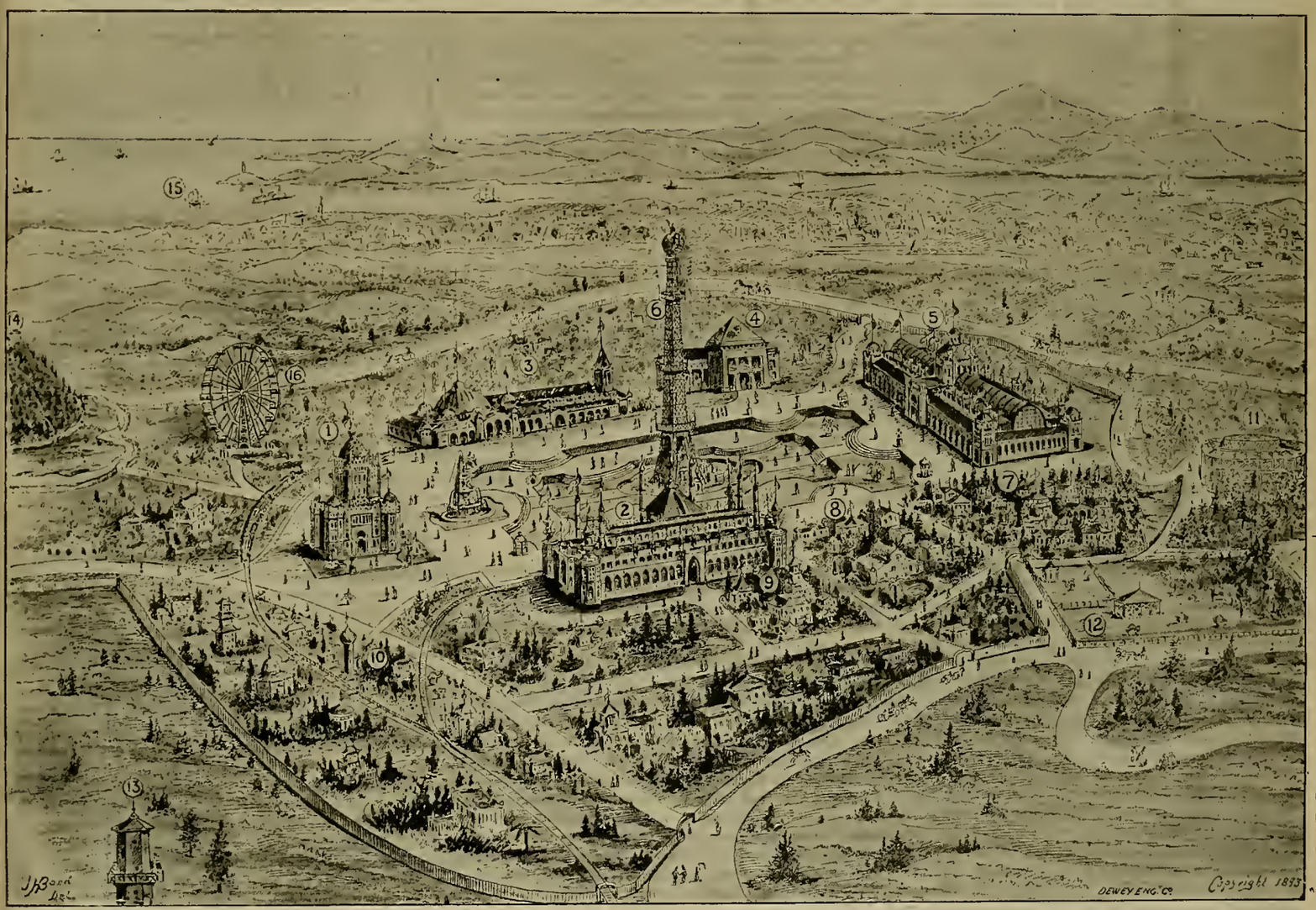
Mioiog	$ 30
Rail haul	80
Lake haul	1 00
Royalty	50
Iosuraoce, commissioo, taxes, etc.	15
Total	$2 75

CONGRESSMAN CAMINETTI objects to a statement in the Sacramento *Bee*, accredited to him, that the act now in force "will really do the valley people more good than it will do the mountaineers." "What I said," he writes, "was that the results of the measnre, so far as river protection and improvements were concerned, would be of vast benefit to the valley, more so in that respect than to the mountains." The statement that it was framed as near as possible to protect the interests of both communities is the one he claims to represent his position.

View of the Midwinter Fair.

Visitors to the site of the Midwinter Fair return with favorable impressions of the extent and style of the improvements which are being hurried forward in preparation for the opening on the first of January next. The engraving on this page, which we reproduce from the *Illustrated Pacific States* of this city, gives an excellent idea of the extent and variety of the structures designed for the different features of this great undertaking for public instruction and entertainment. Of the large buildings around the central court all are now sufficiently advanced to show their style and finish—in fact, several of them are almost completed. Of the scorea of smaller buildings, many are well under way and advancing rapidly. The weather has been unexceptional for the prosecution of the work. We believe work has not been interrupted for a single day by unfavorable weather. This in itself ia a testimonial to the climate of which the fair is designed to he an exponent.

When the dedication ceremonies take place on New Year's Day, there will be 75 separate buildings on the fair grounds. In placing the number at 75 the 50 or more kiosks are not counted. Neither are the tents and huts in many of the villages. Only those structures which may be justly designated main structures are taken into account. Of the largest of these the dimensions may be given as follows: Manufactures building, 462 feet long by 237 feet wide, with an annex. It is surmounted by a dome over 100 feet high. From side wall to side wall the arch will be 158 feet wide. It is the largest single spanning arch ever made for a building on the coast. The Mechanic Arts building is 340 feet long and 160 feet wide. The Horticultnral building is 400 feet long by 200 wide. The Fine Arts building 140 feet long by 132 wide. The Administration bnilding is 70 feet square with a tower 100 feet high. All these structures will be arranged around the central court, shown in the engraving, which will be a beautiful stretch of lawn and handsome plants, amidst which fountains will play, and over all at night the electric lights will flash from the tall tower shown in the picture. It is evident that the fair will be large, unique and characteristic of all that Californians enjoy and are proud of, and richly endowed with striking contributions from the uttermost parts of the earth.



No. 1. Administration Building.
No. 2. Mechanical Arts Building.
No. 3. Agricultural and Horticultural.
No. 4. Fine Arts.
No. 5. Manufactures and Liberal Arts.
No. 6. Electric Tower.
No. 7. Vienna Prater.
No. 8. Hawaiian Exhibit.
No. 9. Chinese Exhibit.
No. 10. Oriental Concessions.
No. 11. Aviary.
No. 12. Buffalo Park.
No. 13. Water Tower.
No. 14. Strawberry Hill
No. 15. Golden Gate.
No. 16. Firth Wheel.

BIRD'S-EYE VIEW OF EXPOSITION AND GROUNDS.

The Raber Amalgamator.

It is stated in the Idaho press that the float-gold-saving amalgamator, invented and patented by N. L. Raber of Corvallis, Or., is about to he given a thorough trial on the Snake river. The exact nature of this appliance is not fnlly known, bnt, as already described in this paper (June 17, 1893) it has a series of plated steps, across each one of which is a removable mercury trough, and the sand, etc., falls or drops directly from each step into the quicksilver. Above each of these transverse mercury troughs is a feed machine which automatically feeds small quantities of some chemical substance which keeps the quicksilver clean and lively. Mr. Taylor thinks these machines will lose no gold at all. No power is required for them, though each machine requires six miners' inches of water. The device is said to have recently heen greatly improved.

The machine is designed primarily for the treatment of heach and river sands. The magnetic iron ore is first removed by a Ball-Norton magnetic separator. Mr. Raber claims that he will demonstrate that the gold flour along the banks of the river can be saved at a cost that will pay to work it even if there is only 50 cents to the ton. According to Mr. Raber the average yield of gold to the ton of gravel is about one dollar, and at that rate one of his machines will net the operator $100 per day. Mr. Raber has heen at work on his machine for 13 years and is said to have spent $40,000 in its perfection. He says that all the efforts heretofore made were on a mistaken idea about rusty gold. The Snake river gold, he says, is not rusty. Gold does not oxidize except by mechanical application. He says that his process will instantaneously amalgamate anything from gold so fine as to be imperceptible to a miner's greased pick.

The device is also applicable to works in quartz mills. It has been in operation at the Mammoth gold mines, Pinal county, Arizona. Mr. G. H. Barnhart, agent of the company, writes to the PRESS that the experiments made have yielded very satisfactory results, and that the company has under advisement the adoption of the "amalgamator" in the large mill about to be erected. It has been tried at no other quartz mill anywhere.

The Raber invention altogether has attracted widespread attention among mining men, and announcement of results will he awaited with interest.

The Volatility of Manganese.

At a recent meetlng of the Academy of Science in France, M. S. Jordan presented a note giving some experlments recently made hy MM. Lorenz and Hoesler, whlch confirm the statement recently made by him that manganese could have heen volatilized at the temperatures ohtalned in metallurgical furnaces. The experlments mentioned were undertaken to ascertaln whether manganese would combine with carbonic oxide and were made with a gas furnace designed by them.

The results proved—

1. That in a current of carhonic acid passed through a porcelain tuhe over metallic manganese heated to a white heat part of the gas was reduced hy the metal, while at the same tlme a part of the metal itself was volitllized.

2. When the current was of carbonic oxide there was still volatilization of part of the metal, while the flame proceeding from the end of the tube shnwed ln a spectroscope indications of the presence of manganese.

3. In a current of dry hydrogen identically the same phenomena were ohserved.

4. In a current of nitrogen, the phenomena of volatllization were repeated, hut the manganese dld not combine with the nitrogen as chromium does. From these experiments MM. Lorenz and Hoesler concluded that carhonic oxide dnes not act upon the manganese, hut that it ls volatllized from the metallic form at a temperature a little ahove its fusing point.

On the Artificial Production of Petroleum.

By Dr. C. Engler, in *Gaslight Journal*.

Scientists have discussed very often in the last few years the question in whicb way petroleum, tbis source of wealth, with its special scientific interest for tbis country, was formed by nature. According to one theory it is generated from lnorganic materials. Sokoloff thinks tbat petroleum was produced durlng the period of the formation of our plaoet out of cosmical hydrocarbons, which in the beginning dissolved in tbe soft mass, separated from it later on. Mondelejeff assumes that water entering by fissures and chasms the interior of tbe earth came in contact wltb melting carbide of iron and produced so in a simple manner oxide of lron and the bydrocarbons of petroleum. Strong objection cannot be made to these two theories from the chemical standpoint; but the compositlon of the different kinds of petroleum ls against them, and geology conslders them not free from objections.

For a series of years the ldea that petroleum was produced from tbe remains of plants by a kind of distillation process was generally adopted, especially by cbemists. Chemical and geological reasons are against tbe theory. From the chemical standpolnt it seems quite lmpossible that the substance of plants could be split up by distillatlon lnto petroleum without leaving charcoal or coke. Tbere would also be a geoetic connection between coal and petroleum; but ln occurrences of the ordinary klnd coal is nearly always absent. If tbls were really the case, then there ought to be with every oil occurrence in close connection a coal bank, whlch really seldom happens.

By a third theory the remalns of animals form the raw materlals from which petroleum is formed by nature. There are many facts provlng the decay of masses of animals which we find now ln banks in the crust of the earth in the form of the remains of shells, fishes, saurians, etc. Prominent scientists, amongst them the Americans Wrigley, Whitney, Hunt and others, and ln Europe, Hofer and Ochsenius especlally, defend this ldea on geological grounds. But I will not enter into the geológical discussion, preferring to try to give an answer to the question: How can the transmutation of animal remains into oil be imagined?

Io order to answer this some thousands of salt water fishes and also shells bave been distilled under strong pressure. Tbe result was a liquid containing mostly nitrogenous bases, such as pyridin, whicb was little or not at all similar to petroleum. I then recalled some experiments of Wetherlll and Gregory, who found tbat the wax found in cadavers, the so-called "Adipocere," was nothing else but the fatty residue which remains after the putrifaction of all animal matter, especially of the nitrogenous constltuents of the cadaver. It ls also well known that even fossil bones frequently contain fat. The question now raised was tbis: Could not the process in nature bave been a similar one; should not first of all the nitrogenated animal substance have been destroyed leaving the fat, wbich was tben transformed into oil. In order to prove chemically tbls possibillty, I submitted anlmal fat (train oil) to distillation—first in a sealed glass tuhe, later on in a large iron vessel—under a pressure of 25 atmospheres at a moderate heat (300–400 C.), and to my great delight fonnd tbat under favorable conditions 70 per cent of the train oil was transformed into petroleum. Tbis equals 90 per cent of tbe tbeoretical output. Besides the oll some water and some combustlble gas also formed. The same bebavior has been shown by otber fats like butter, tbe fat of hogs, artificlal fats, also the chemically pure glycerids of the fats like tri-olein, tri-sterin and the free fatty acids. All could be transformed into petroleum by dlstiliatlon uoder pressure, wben managed ln tbe proper way.

Tbis liquid, whicb you see here, is tbe distillate of the fish oll, and I bave isolated from it almost all the hydrocarbons whlch have been discovered in the petroleum of Pennsylvania. Tbe other products—the oll burning in tbls small lamp, too—are oils contained in the crude materlal by purification.

But not only lllumlnating olls are produced. I separated also by distillation tbose llgbter hydrocarbons which compose the gasoline, the ligroln, the benzine, etc. Recently I have succeeded in finding and separatlng para ffin wax and lubricating oils from those parts of the crude oil wbicb show a bigh boiling point. This removes tbe objection of O. Ross to my theory of the formation of petroleum from animal remalns. As a matter of fact I have found ln the dlstillate obtained by decomposition of traln oil nearly all the constltnents whicb have been separated from the natural crude petroleum, and even the gases, whlch, like natural gas, consist essentially of marsb gas.

Very recently I have made close lnvestigatlons on the mechanism or on the chemism of the formation of the hydrocarbons of tbe petroleum produced by dlstillation of fat under pressure. Tbis paper is published in a recent number of the *Berichte der Deutschen Chemischen Gesellschaft*, 1893, 26, 1436. These experiments prove that the simpler organic acids split up in tbe same way, yielding almost tbe theoretical quantity of the respectlve hydrocarbon. Thus pbenylacetic acid yields toluene. For further details I am obllged to refer to the paper itself. I need only remark tbat we have to assume tbat the acids with high molecular weights are decomposed witb the production of a number of hydrocarbons.

To recapitnlate, it is a geologlcal fact tbat we find in nature the remains of antediluvlan anlmals as shells, fishes, saurians accumulated in masses. Wbether these animals have been piled up in consequence of a natnral super production in special places ln the ocean, or by cnrrents, nr in consequence of great revolutions of tbe earth, this must be decided by geology; but the remains exlst.

Now ln whicb manner do the organic substances of these anlmals become decomposed?

The animal substance consists essentially of nitrogenated material and fat. Tbe fnrmer is easily decomposed, the latter is very stable, a fact wbicb has been very well known for a long time and has been sbown again by exact investlgations. Tberefore we find the wax nf cadavers in nld graves; therefore the fat in tbe bones nf mammals tbousands of years old; therefore the fat on tbe bottom of tbe ocean recently found.

Whether and bow the fat was decomposed in this long period by tbe water splitting up glycerol and forming the free acld, for instance the fat in tbe bones of mammals, cannot be answered. Botb, fat as well as the fatty acids from petroleum, when dlstilled under pressure.

We can imagine tbat such remains, wrapped in mud and transported by the currents in the ocean, easily accnmulate and later on, under the pressure of sedlmentary layers or strata, perhaps under the influence of heat, too, are transformed lnto petroleum. Tbis is only one of tbe many possibilities by wbicb tbe mecbanical process of the transmutation of fat into petroleum may have happened.

Under any circumstances I think I bave proven that from tbe chemlcal standpoint, the formation of petroleum from animal remains has the greatest probabillty, as we are able now to transform every anlmal fat into petroleum.

A New 100-Ton Furnace in Australia.

Tbe new furnace at the Broken Hill Proprietary mlne is described by the *Mining Standard* as a 100-ton furnace. It is water-jacketed throughout. The top half nf the furnace consists of four bollow-wrougbt steel jackets, three being 9 feet 9 incbes deep, and the fourth, wbich carries the flue, is 8 feet deep. The water ls fed in at the bottom of each jacket, and all the jackets are connected together so as to make sure of an equal circnlation of water througb them all. The two side jackets have two lugs, and the two end ones three lugs riveted on the outslde of them, and which rest on an oblong frame of 8-inch I iron, the corners of wbich rest on four bollow cast-iron columns or pillars. The jackets are then fastened together witb a wrought-lron strap passlng around them. Between tbe bottom edge of these jackets and tbe top of the crucible is a space of 5 feet, where tbe cast-iron jackets go. Tbe lower half of the furnace consists of 20 jackets in all, eacb 20 inches wide. There are 6 jackets on each side witb tuyeres, and 4 corner jackets witbout tuyeres, the 16 being cast iron, and there are 4 wrougbt-steel end jackets, eacb with a tuyere opening ln tbem. The tuyere openings are in the middle of the lower balf nf the cast-iron jackets, and not as they are in the other blast furnaces in Broken Hill, between two jackets. Tbe water is fed into eacb jacket, about the middle of its lengtb, and as it is closed at the top it is kept full and under a certain amonnt of pressnre nf water by a goose-neck arrangement for the overflow of the waste water, whlch delivers the water into a copper launder some nine inches above the top of the jacket. Tbis lannder is by tbls arrangement made a fixture, and need not be moved wben it ls necessary to remove a jacket. All the water from top and bottom jackets, tuyeres, breasts and slag spouts dellvers into tbls launder, which emptles into the hollow columns from which pipes carry the water to tbe cooling tanks. Each of the lower jackets has three legs on eacb side of the front face, so that the wbole 20 can be bolted together. To further strengtben them a binder made from steel ralls is also bolted around them just above tbe tuyeres. A pressure of about 30 tons from the charge in the furnace has to be resisted. Usually before a jacket is to be removed and the girder just spoken of taken off tbe furnace, the jackets are propped up to prevent tbem bulging ont with the weight of the charge. These props are always ln the way, and to do away witb tbem a jacket fastener has been lntroduced, whlcb fulfills the same duty. It consists of a carriage which sildes along tbe under side of a girder fixed between the columns sligbtly above the level of the top of the lower jackets, throngh whlch passes a sqnare-headed screw, the point of wbich enters a small hole countersunk in the face of tbe jacket when screwed up tightly, so tbat tbe jacket cannot move in the sligbtest degree. Wben a jacket has to be removed, tbe screw is loosened and the carriage slid along the girder out of the way. The blnder is taken off tbe ontside of the jackets, and tben the jacket is ready to be pulled nut. Tbere are 24 of tbese jacket fasteners, one being used for each jacket, except the corner ones, wbich have two. The cruclble of tbe furnace is similar to other crucibles on the hill. The general deslgn of tbe furnace is similar to the No. 2 furnace now ln blast, whicb is from plans of Mr. Howell. It is expected that this furnace will be an extremely handy one as far as its fittings go, and experience has proved tbe design to be the best in otber ways, although the scarcity of water in this dlstrlct has prevented lt being more generally used.

Wben the three furnaces are in full blast they will have a capacity for treating between 1000 tons and 1100 weekly, so that the output of bullion in tbe future will be considerably augmented.

The New Coolgardie Field.

Tbe new gold field of Coolgardle in western Australla, has recently attracted some attention and has drawn thitber a large influx of mlners from other regions. The *Mining Standard* bas an intervlew with Mr. George Gorrie, one of the promoters of Bayley's Reward, the original location. Says Mr. Gorrie:

"Tbe reef ln Bayley's Reward goes on developing very promisingly. Both nortb and sonth an enormously rich shoot of gold extends witbont any diminution so far. Wben I left Coolgardie one shaft was 55 feet deep on the course of tbe lode, and the gold at the bottom was quite as rich as near tbe snrface. Tbe main shaft is some 200 feet east of tbe lode; it is 10 ft. x 4 ft; well timbered with sawn timber, and in tbis tbey antlcipate that tbey will cut tbe lode at 300 feet. In this shaft also tbey struck water at 94 feet, and the lnflow of water at 154 feet was 400 gallons per hour. They have already taken out about 13,000 ounces of gold from 11 tons of stuff; and they have 1000 tons at grass wbich I feel certain will go 20 ounces to the ton, straight from the stamps. You know Bayley's management refuse to treat anything tbat will not go a penny-weigbt to the pound of quartz. For obvious reasons their machinery is of the simplest description—a four-horse power kerosene engine, which drives a panklast and pan. Already they bave paid 22s 6d per share in dividends.

"I tbink Coolgardie has a big future. I have very little doubt but tbat it will be a permanent reefing field. The lodes are wide and well defined, so far as at present opened up. The stone carrles a considerable amount of iron and some specks of galena, but it is very free indeed of tbe baser metals, and good for amalgamation—that is, toward tbe surface. Below the water level, I believe, it will be found to be a dense iron lode. The stone is not at all patchy, the gold being regularly distributed. In Bayley's tbe lode is seven feet in width. Tbe western lode we have ls between tbree feet and four feet. It is almost impossible at present to say wbat is the area of the gold-bearing country in tbe dlstrlct around Coolgardie. Tbe place bas not yet been thoroughly prospected. Men had to carry water and provlsions, so they could not thoroughly prospect, except within a radius of three or four miles. Alluvial gold bas been found all over the surface, and our western reef traverses No. 6. Four or five miles away there are some good sbows, with indications of permanent lodes."

THE following communicatlon in a London mining paper from "X. X.," under date of October 20th, will be information in California:

SIR:—I see that in some of the financial dallies tbe writers complain of being in the dark as to the position of the Golden Gate and Golden Feather companies. Perhaps you will enlighten them by publishing this letter:

Col. McLaughlin has attacked the qnartz lode in Golden Gate, witb the following result: He has driven an adit of upward of 500 feet on the course of tbe lode, proved it to surface, 120 feet or tbereabouts, and in depth some 40 or 50 feet.

Tbe whole of this is in ore worth about $22 (upward of 1 oz. to tbe ton), and now he has struck into ore ranging, by last accounts, up to 6½ ozs. per ton.

The amonnt of ore practically proved is about 7000 tons, worth from 20,000*l.* to 25,000*l.* The lode shows a splendid ontcrop for at least three-quarters of a mlle in the company's ground. Witb 20 head of stamps a net revenue of 25,000*l.* per annum should be easlly obtained. Golden Feathers are suffering from reiterated attacks of interested parties, who point out tbat the month of November is at hand.

That month, with all due deference to these gentlemen, ls usually the most beautiful montb ln the Californian year.

In six weeks, witb 240 men, working in shifts, and inefficient appliances, the "old people" got out 140,000*l.* sterling.

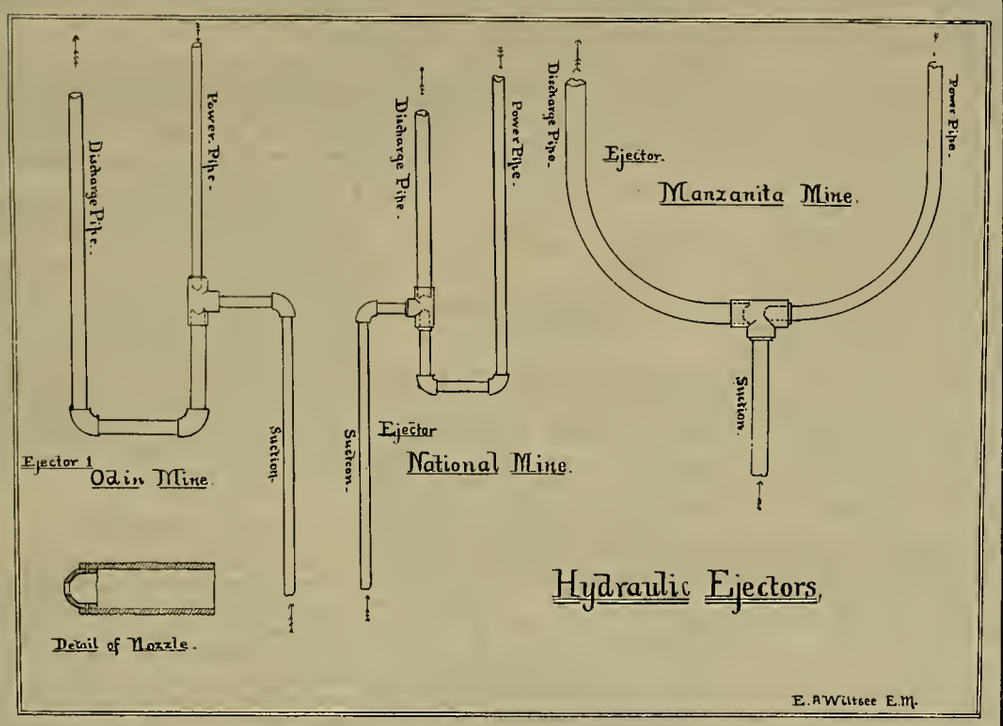
Tbe present water-power in use represents about 1100-horse power, so tbat the posslbllities of tbe next six weeks are of no small signlficance.

Hydraulic Ejectors.

By E. A. Wiltsee, E. M., in the Eleventh Report of the State Mineralogist.

This ingenious device for the elevation of small quantities of water without the aid of pumping machinery has found quite a widespread application among the drift gravel mines of Nevada City, Nevada county, where the quantity of water is small and water power under high head easily procurable. The contrivance depends upon the principle of induced currents for the raising of the water into the pressure stream immediately in front of the nozzle; once there, it is elevated to the surface simply by the force and velocity of the larger stream of power water, which makes the ascent of the discharge pipe under the influence of its heavy head.

The arrangement of the machine, if such it can be termed, is quite simple, and is shown in the accompanying sketch. The component parts are: The pressure pipe from surface, down which the power stream is conveyed; an ordinary "tee," into which the power water discharges through an internal nozzle, to be received in an internal receiving nozzle of slightly larger diameter an inch or two away. Into the branch arm of the "tee" the suction pipe from the sump is fitted, so as to deliver the water, induced by the vapor formed, into the pressure stream between the "tee" nozzles; and lastly, the discharge pipe to surface, a little larger in diameter than the power pipe conducting the pressure stream down.



The construction of the nozzles is very simple. The fitting entering the "tee" is a nipple, to which the pressure pipe is attached externally by a coupling. On the inside of the nipple is riveted a blunt nozzle with the necessary aperture, as shown in sketch. The receiving nozzle is of the same description, but a little larger in diameter and riveted into the end of the nipple entering the other end of the "tee," and to which the discharge pipe is coupled. The nozzles are thus adjustable within a certain distance by means of the nipples, and in small machines this has been found ample. The construction of the nozzle is shown in the sketch. The size of the nozzles used on these small arrangements is usually three-eighths of an inch in diameter for the pressure nozzle, and five-eighths of an inch for the receiving nozzle. This proportion does not appear to be absolute, the requirements of the contrivance being that the receiving nozzle shall be large enough to receive the pressure stream and the added water to be elevated, and near enough to the pressure nozzle to collect and receive the stream before it breaks and scatters. A valve should always be placed in the power pipe near the "tee," in order to turn off the power water in case of any accident to any part of the apparatus. It would also be advisable to have a large valve in the discharge pipe near the device, if the discharge were of any considerable size and contained any large quantity of water.

Three arrangements of the device are shown in the sketch, not because all are deemed advisable, but as representing the three types found in actual use.

No. 1.—That used in the Odin mine; is the worst of the three, and is considered by the writer an example of "what not to do." In this arrangement the power stream, after entering the receiving nozzle and having the additional stream to be elevated, is forced around two right-angle turns, and necessarily loses a large proportion of its velocity, power and working force.

No. 2.—In use at the National mine, and the original device of the inventor, or designer, is to the mind of the writer by far the best mechanical device. The full power stream is led around the turns before its discharge from the nozzle, and the discharge, when it does take place through the reduced nozzle, is straight up in the direction in which its work is, with no impediment or obstacle in its path except the natural friction of the straight pipe.

No. 3.—The arrangement in use at the Manzanita mine; while not so bad as No. 1, would seem to impare the force of the working stream to some extent by reason of the heavy friction entailed by leading the stream around the bend preparatory to its upward flight. As the design has been used but a short time, though with great success in every case, it was impossible to get any exact figure as to the amount of work done, or percentage of power realized from the working stream. As nearly as the operators of the device could state, about one-quarter to one-third of the number of inches of water employed in the power stream were raised from the water of the mine. In other words, a power stream of four miner's inches would elevate with it one and one-half miner's inches from the mine. It is to be hoped that the users of this arrangement will carefully measure both streams and ascertain the exact amount.

The power water was employed under various heads, varying from 600 feet in the Odin mine to 200 feet in the National mine. The water was elevated 180 feet in the Odin mine, 210 feet in the Yosemite mine, and 100 feet in the National mine. As the power water is delivered at the bottom of the shaft or workings, the working head will always be increased by the vertical distance from the surface, in addition to the head of power water at that point.

The nozzles are placed, in these small arrangements, at a distance of from one to two inches apart. The adjustment is made by trial after the device has been put together. The designer of this form of hydraulic ejectors is Mr. Rounder, of the National mine, and to him is due the credit of the application of the principles involved.

The application of the device, while somewhat limited, is of considerable importance. By its use all heavy expense for pump columns and attendant machinery is saved—no small item in prospecting operations. While it has not as yet been tried here on a large scale, to the knowledge of the writer, it is certain the operation would be successful, the only question being as to whether its operation would be economical, on account of the small percentage of the power realized. Where water power is free this item would not enter into consideration; but when the quantity to be raised is small, and the distance to be elevated not too great, and when water power can be obtained under a heavy head at reasonable rates, the application of the device would seem to be economical and desirable in every way; and it has been applied frequently, under conditions of the above nature, in and around Nevada City. It requires practically no watching, has no wearing parts, and never wears out.

Where to Dig for Gold and How.

An old California miner, Mr. W. P. Buckhurst, writes to the Australian press as follows: "If I had a friend going to start farming, my advice to him would be, shun all poor, hungry land as you would a pestilence. Get into a district noted for good land, and you may succeed. Well, it is just the same in mining. If a party is forming to go prospecting, the first best thing to do is to secure the best mining maps of the colony, and then trace on them the auriferous belts on which the richest diggings have proved to exist, and shun those that have never proved more than 'tucker diggings.' They are like poor land—will always keep a man poor. Shun South Africa and be chary of West Australia. Having decided on the field you intend to try, get well within the limits of the proved auriferous belts, for gold-bearing country generally runs in belts for miles east and west or north and south, as the case may be, and then prospect in the gullies or creeks untried or deserted between, but in the line of old paying diggings. A capital plan, which we used to adopt in California, where we did not look for the Government to do anything for us (as I fear is too much the case here), was to form a party of six with confidence in each other and divide up into three parties of two each. One couple would go to work washing over again old 'tailings' of some rich gully, or tunneling claims, or working little paddocks that had been left untouched between the workings of some deserted diggings to make tucker for the six. The other two couples would go prospecting in different directions in the likely or promising looking gullies in the neighborhood, and if either of the parties struck any promising ground all would unite and work it, always bearing this in mind, viz., that quartz is the matrix of gold, and when any good alluvial gold is discovered in a gully or creek there is pretty sure to be a pay ledge somewhere above, and that is the place to look for them, although the formation of the gold-bearing country here is different from California. Here there is more deep sinking for alluvial gold.

"Never leave half-ounce diggings to go prospecting. There is one other point that may or may not hold good here as it did in California, but which prospectors would do well to carefully observe and take a note of—one of the things our California geologists poohpoohed and ridiculed, viz., that on the rich gold-bearing flats up on the side of a mountain, in the gold belt, the same class of vegetation or a certain kind of tree predominated, though the diggings were sometimes seven miles apart. 'What has a tree on the surface to do with the gold 30 or 50 feet below?' says the geologist. It's puzzling, like many other things in gold mining, but there was the fact, which many old miners noted. A certain class of strata, thrown up in the upheavals ages ago, may have favored the growth of a certain class of tree."

The Transvaal Boom.

A Transvaal correspondent to a Montana paper calls attention to several features of life in South Africa that are worth repeating. "A very noticeable feature of this new country," he says, "is that nobody carries a 'gun' and there is no toughness such as characterizes mining camps in other lands. For upward of six years hundreds of thousands of ounces of gold have gone annually from this place by stage and the coach has never been held up or a pennyweight of gold lost in transit. A box containing over 100 pounds avoirdupois of gold was dropped off the coach on one occasion and it was picked up and brought on by another team.

"There are about 300,000 souls, black and white, in the republic, and its President receives $40,000 per annum, house rent and $1500 a year for 'coffee money.'

"There are plenty of crocodiles in the river. We see them often and ran onto a snake a few days ago that would raise the hat off a man's head. We estimated his length at twenty-five feet and diameter at eight inches; and we have not taken a drink for two months, either, so the snake was real."

Twenty-five hundred stamps are now dropping night and day. One man is said to make $1.50 ore pay. Native laborers are said to get $7.50 per month and it costs $5 more to feed them.

The country is declared to be "on the eve of a colossal boom." It is a peculiarity of booms that they are always "coming." They are based on anticipation. Realization, or failure to realize, generally ends them. It is a fact that the Transvaal has for some time been experiencing a genuine boom, and it is probably true that matters soon will be, if they are not now, down to a bread-and-butter basis. It is likely that the gold output will be increased, but not in the degree expected. It is too much to say that the Transvaal boom is over, but the chances are favorable that it is near its height, while the people of Transvaal think it has not begun.

Scientific Progress.

Barnard on Astronomy.

Prof. E. E. Barnard, of the Lick Observatory, recently gave a lecture on astronomy in this city. Many stereopticon illustrations were shown. Professor Barnard said that photography had enabled the astronomers of to-day to see plainly that of which their brethren of a few years ago had never dreamed. Even the trained eye of the most eminent astronomer begins to grow tired after looking through a telescope a minute, and after that his vision becomes less acute. Any object that he fails to notice in that short time passes by unseen. The plate in a camera, however, may be left exposed for hours, during which time even the faintest star will have left at least some slight trace.

About 60 stereopticon views were presented, showing some of the most interesting of the heavenly bodies under varying conditions. In a photograph of the moon's surface could be seen the dark areas called seas, and the vast lunar craters.

A picture of the sun's disc revealed a sun spot said to be three times as large as the earth. Ragged-looking holes that looked as if they had been made by a tremendous explosion, were plainly visible, and were said to be shattered places in the sun's atmosphere.

Two drawings of the planet Mars were particularly interesting. It will be remembered that this brilliant neighbor of ours is about 35,000,000 miles distant from the earth, and therefore the difficulty of obtaining an accurate representation of it may be imagined. The planet as a whole is of an ochre cast, but the trained eye of the astronomer detects little green spots, believed to be water, and others supposed to be land. At the poles are white spots, evidently ice and snow. This white region diminishes in density as it approaches the equator, and finally disappears altogether. Professor Barnard said that these spots increase in extent as the planet moves away from the sun and the temperature presumably grows colder, thus tending to substantiate the theory that the poles of Mars are surrounded by ice and snow, as are those of the earth.

The streak across the sky commonly known as the milky way becomes a thing of beauty when reproduced on canvas by means of a camera. The clouds of countless stars, each one a great sun in itself, assume an added brilliancy that one would hardly suppose exists when looking at them with the naked eye. It requires four hours for this collection of heavenly sparklers to make an impression on the supersensitive plate of a camera, and during all this time the camera is moved by clockwork to keep pace with the stars as they seem to be winging their tireless way through space. The great comet of 1882, which startled all the world with its long tail, was reproduced with startling effect. This comet has a tail 100,000,000 miles long, and will not be again visible to the inhabitants of the earth until 800 years have passed away.

Powerful French Telescope.

A great refractor is just finished and placed in position for Dr. Janssen at Meudon. It is a combined photographic and visual telescope. The two lenses were made by the celebrated Henry Brothers, of the Paris Observatory. The mounting is by Gauthier, of Paris. Both lenses will be mounted in the same tube, which is *square* and of steel. The visual objective is 82 cm. (32·3 English inches) in diameter, while the photographic objective is 63 cm. (24·8 English inches) diameter. Both lenses are of the same focal length, 17 meters (669 English inches). The large objective will be the guiding part of the instrument when used for photography. This great telescope is housed in the ruins of the royal palace, a part of the ruins serving as the tower for the great dome, which dome is 20 meters (66 English feet) in diameter and weighs some 60 or 80 tons. The dome is to be moved by a gas engine of 12-horse power. The observing chair is attached to the dome and moves with it. All the fine circles are to be read from the eye end by means of electric lights, the electricity for which is to be generated by an eight-horse-power engine half a mile distant, in what was formerly the royal stables.

Movement of Diamond Molecules.

Sir R. Ball, who is fond of revealing the marvelous, has been studying the mysterious action of molecules; and what he has to say concerning the movements of the molecules of a diamond is as truly surprising as anything he has told us about the sun and the planets. Every body is composed of a multitude of extremely, but not infinitely, small molecules, and it might be thought, says Sir Robert (according to a contributor in the Newcastle, Eng., *Chronicle*), that in a solid, at all events, the little particles must be clustered together in a compact mass. But the truth is far more wonderful. Were the sensibility of our eyes increased so as to make them a few million times more powerful, it would be seen that the diamond atoms, which form the perfect gem when aggregated in sufficient myriads, are each in a condition of rapid movement of the most complex description. Each molecule would be seen swinging to and fro with the utmost violence among the neighboring molecules and quivering from the shocks it receives from the vehement encounters with other molecules, which occur millions of times in each second. The hardness and impenetrability so characteristic would at first sight seem to refute the supposition that it is no more than a cluster of rapidly moving particles; but the well-known impenetrability of the gem arises from the fact that, when attempt is made to press a steel point into the stone, it falls because the rapidly moving molecules of the stone batter the metal with such extraordinary vehemence that they refuse to allow it to penetrate or even to mark the crystallized surface. When glass is cut with a diamond, the edge which seems so hard is really composed of rapidly moving atoms. The glass which is cut is also merely a mass of moving molecules, and what seems to happen is that, as the diamond is pressed forward, its several particles, by their superior vigor, drive the little particles of glass out of the way.

Meteors.

The following historic account of meteors is given in a local paper: A meteoric stone, which is described by Pliny as being as large as a wagon, fell near Ægospotami, in Asia Minor, in 467 B. C. About A. D. 1500 a stone weighing 1400 pounds fell in Mexico and is now in the Smithsonian Institution at Washington. The largest meteoric masses on record were heard of first by Captain Ross, the Arctic explorer, through some Esquimaux. These lay on the west coast of Greenland, and were subsequently found by the Swedish exploring party of 1870. One of them, now in the Royal Museum of Stockholm, weighs over 50,000 pounds, and it is the largest specimen known. Two remarkable meteorites have fallen in Iowa within the past twenty years. February 12, 1875, an exceedingly brilliant meteor, in the form of an elongated horseshoe, was seen throughout a region of at least 400 miles in length and 250 in breadth, lying in Missouri and Iowa. It is described as "without a tail, but having a flowing jacket of flame. Detonations were heard so violent as to shake the earth and to jar the windows like the shock of an earthquake," as it fell about 10:30 P. M., a few miles east of Marengo, Iowa. The ground for the space of some seven miles in length by two to four miles in breadth was strewn with fragments of this meteor, varying in weight from a few ounces to seventy-four pounds. On May 10, 1879, a large and extraordinarily luminous meteor exploded with terrific noise, followed at slight intervals with less violent detonations, and struck the earth in the edge of a ravine near Estherville, Emmet county, Iowa, penetrating to a depth of fourteen feet. Within two miles other fragments were found, one of which weighed 170 pounds and another 32 pounds. The principal mass weighed 431 pounds. All the discovered parts aggregated about 640 pounds. The one of 170 pounds is now in the cabinet of the State University of Minnesota. The composition of this aerolite is peculiar in many respects; but, as in nearly all aerolites, there is a considerable proportion of iron and nickel. It is generally held that meteors at one time or another formed integral parts of a comet. The meteor enters the earth's atmosphere from without with a velocity relative to the earth that is comparable with the earth's velocity in its orbit, which is nineteen miles per second. By the resistance it meets in penetrating the air, the light and the other phonomena of the luminous train are produced. Many small meteorites are undoubtedly consumed by this fire, caused by friction, before they reach the earth's surface.

Mechanical Progress.

Canal Cutting and Dredging on the Sacramento.

The progress of work by the new canal-digging machine on Grand island, and of the dredger for strengthening the levees, are thus described by the *Record-Union:* The machine built to cut the drainage canal inside the island is a one-yard Marion Steam Shovel Company's ditch dredger. The machinery was placed upon a hull 22 feet by 70 and cuts a canal 23 feet wide. This machine was started to work September 18th, and excavated during the remainder of that month 16,100 yards, requiring, of course, some few days for the thorough adjustment of the parts. During the month of November it excavated 62,770 yards, or 2414 yards for each working day in the month, or 115 yards for each working hour.

The material was deposited on both sides of the cut, and the month's work was a uniform canal 12,413 feet long for two and one-third miles, 23 feet wide, and a little over an average of 6 feet deep. The only delays were occasioned by fog on the morning watch, which on six or seven mornings occasioned a delay of three or four hours.

This machine is in charge of Allen Adams and is giving the land-owners first-rate satisfaction.

The dredger "Grand Island," built for the river levees, is a clam-shell, with a hull 40x80 feet, and with a boom 105 feet long. This machine is handling a bucket weighing 8000 pounds, with wire ropes in place of chains. It was started to work on the 30th of October, and for 22 hours per day is delivering, as nearly as may be, one bucket per minute, averaging in the material it is working in (fine river sand) two cubic yards to the bucket. This material, from the point of excavation to the point of delivery, is being moved 150 feet.

This dredger is building a roadway outside of the present levee, 16 feet wide, and at the same time furnishing material to put a two-foot crown on the levee. It has already made one mile of this work, and it is expected to progress at the rate of about a mile in 11 days. It is in charge of J. Hyde, and with a few more days' breaking-in of the machine and crew, will be a very efficient machine.

The machinery is all completed by Byron Jackson for the additional pumping plant to be installed at Ryde, and this plant will have a capacity of 30,000 gallons per minute, with compound engines of the newest type, and will, it is believed, with the large plant already in, give complete control of the rain and sipage waters.

The Zalinski Dynamite Gun.

New dynamite guns, the invention of Captain Edward L. Zalinski, stationed at the Presidio, San Francisco, are in use on the El Cid, of the Brazilian navy. The guns are pneumatic, and are most extraordinary pieces of ordnance to look at. They are more like a gigantic smooth-bore fowling piece than anything else, bearing a strong resemblance to the tall, narrow smokestacks in use on Mississippi-river steamboats thirty and more years ago. They are made of steel or aluminum bronze, and about half an inch thick and about thirty feet in length, but they can throw dynamite, gun-cotton, explosive gelatine, or, in fact, anything that will blow up. They are more quickly and easily handled than the ordinary powder gun.

They are able to scatter lumps of dynamite, gelatine or gun-cotton weighing a quarter of a ton, and do it accurately, too. They make no deafening report or cloud of smoke, but simply belch out torpedoes as a Roman candle does lights.

They throw a quarter of a ton of explosive gelatine a distance of a mile, and smaller masses three times as far.

Captain Zalinski has been working on this gun for the last six years. When he left the Presidio several months ago for the East, it was generally understood among his brother officers that he was going to superintend the construction and mounting of some of his pets, and since the Brazilian outbreak that he might be employed to instruct the Brazilians or their representatives in the use of the destroyers.

Coal Oil in Steam Boilers.

Evidence that a little petroleum used inside of steam boilers will prevent the formation of scales increases. An American publication, the *Safety Valve*, has printed a letter from a manufacturer who has tried this agent for over six years in a plain tubular boiler, serving a 50 or 60-horse power engine. Every fortnight the fires are drawn and the boiler washed. On refilling, about two quarts of oil are put into the water, and two or three quarts more are added, one at a time, during the next two weeks, in this manner. Just below the injector suction pipe is a well containing a quart. This is filled with oil when desired. The well and pipe are connected with a "T" and two cocks, and the water is thus drawn in over and with the oil, transferring the quart in two or three hours. A Providence firm, using a 125-horse power boiler, has a special device, called an oil injector, and consumes about the same amount as in the other case. Ordinary kerosene, of the cheapest quality, is said to be preferable. In the Providence experiments, the boiler was examined after 10, 14 and 28-day runs, and every time the tubes and sheets were as clean as when new. The manufacturer first referred to here says: "Since we have used the oil we have not found it necessary to use any mechanical means to keep the tubes and tube heads in order. Of course the oil does not prevent the precipitation of the lime that is in the water, but it is in the form of loose scales and does not adhere to the iron."

A New Pumping Jack.

A new pumping jack, the invention of Mr. Ezra Taylor, of Ojai, Cal., is thus described in a local paper: The pumping jack, in short, is a multiplication of applied power in pumping water, and, it would seem, will go far toward solving the water supply in a given well or locality. The jacks are sub-

stantial and well finished, and have every appearance of lasting a lifetime. The capacity of an arm which is attached to a pump in the pipe can be adjusted from a 6-inch to a 14-inch stroke, the latter of which, in a 3-inch pipe, will raise 18 gallons of water per minute. A well that can resist the jack working at its full capacity, and still "hold its own," is almost limitless. The jacks are supplied with shafts for either horse-power or engine attachments.

An Indiana Man's Wonderful Clock.

R. H. Sites of Portland, Indiana, will show a wonderful clock at the approaching Midwinter Fair. It is 13 feet high and 9 feet wide. The main dial is two feet in diameter, and it gives both sun and standard time, also the day of the month. On its face is a number of smaller dials, one giving the day of the week. Another shows the origin of the days, by the planets appearing as they were named in the second century, when the mode of reckoning time by weeks was adopted. On Saturday, Saturn appears; on Sunday, the sun; on Monday, the moon, and so on. Another dial points out important past events, fixed days that are most observed by the churches and the so-called unlucky days in each month as the ancients respected them.

Still other small dials show the time of the rising and the setting of the sun, the four cardinal points, the moon's phases, increasing and decreasing, and the moon's age in days and quarters. An ocean scene, with indicator attached, gives the ocean tides so that their proportional height can be seen at any time. The large dial exhibits a table of mortality, showing the proportion of deaths, based on a calculation of 10,000 persons. Still another dial is that from which the clock takes its name, the 100-year astronomical clock, which points out the ruling planets from 1876 to 1975, the long pointer from the center of the dial indicating the day of the month.

The solar system is represented by the earth, sun and moon, the center being a fixed sun, the larger ball the earth, and the smaller ball by its side the moon. The earth revolves around the sun, keeping pace with the solar time dial on the large dial, previously described, and the moon revolves around the earth in unison with the moon dial, showing the months of the year—winter, spring, summer and autumn.

On top of the clock is a figure representing Sir Isaac Newton taking views through his large telescope, which changes position on the quarter of the hour; the figure turns about and revolves one-fourth of a circle looking east, west, north and south. On either hand are the battlemented towers of an ancient castle. To the right of the dial are three sets of moving figures; the first is General Washington reviewing his army; the second the Presidents of the United States in the order in which they were elected; and the third the ancient mode of capital punishment is shown by the death of Mary Stuart by the ax.

On the left are also three sets of figures. The first, or uppermost, shows the flight of time with the four seasons. In the second the heroes of '76 are honored by a bow and wave of the hand from the Goddess of Liberty, all except Benedict Arnold, who is allowed to pass unnoticed. The lower one is a tableau picturing the fondness of the elephant for children. There are two other sets of figures, above and below the main dial, which are scriptural in character. In the one above an upright figure keeps time to the music with his hand, and another, kneeling by his side, strikes the hour with a hammer.

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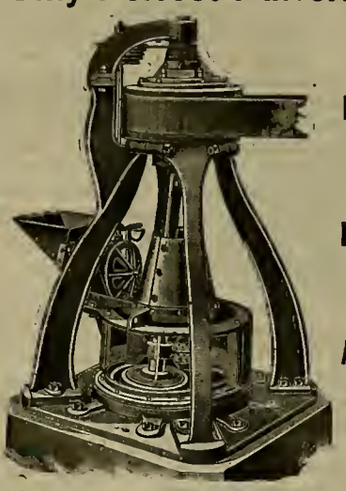

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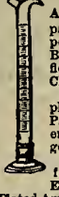

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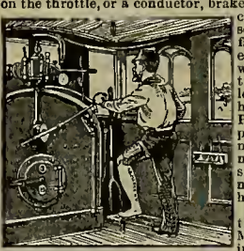

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Electricity.

The Hydrograph.

The remarkable property possessed hy water for condncting sound is well known, but we are not aware that any successful attempt has hitherto been made to turn that property to account for signaling purposes. Its utiilzation in that direction, however, seems to have been effected in a practical manner by Captain Neaie, who has devised a system by means of which slgnais can be given, messages exchanged and conversation held between ships on the sea or on rivers, whether moving or stationary, or between ships or lighthouses and harbors, forts or pier on the shore, or vice versa. Communication, moreover, is effected without any connection whatever between the two objects except the body of water in which the ships float or the lighthouse stands, the water being the whole medinm through which the message is transmitted. The system depends for its action upon harmonics, and its principle will be understood by a reference to the well-known fact that upon a musical note in a given key being sounded an object capable of emitting sound in the same key will, under certain conditions, sympathetically respond by emitting a sonnd similar to that which awakened its vibration.

It is, of course, a primary condition that the two objects shall be normally tuned in unison. Working upon this fixed principle, and utilizing the high conductivity of water for the transmission of sound, Captain Neale has constructed a signaling apparatus, which consists of a transmitting and receiving instrument, which, when in operation, are in no way connected with each other except through the medium of water. The apparatus as described by the London *Electrical Engineer* is monnted in two punts, the transmitter on one and the receiver on the other. The transmitter consists of a bell abont 16 inches diameter attached to the lower end of a framing which is fixed to the side of the punt, the heil being submerged about six feet. At the upper end of the framing is a crank handle, which is worked from the pnnt and actuates a doubie-heat hammer which strikes and sounds the hell. The Morse code is employed, and signaling is at present carried on by hand, but electricty is intended to be used. The operator gives the handle a quarter turn for the dots of the code, and a whole revolntion fnr the dashes. The receiver, whlch is on the second punt, consists of a a pair of metallic drums, ahout ten inches diameter, open at one end and fixed, mouth to mouth, upon a piece of hoard which is sandwiched in between them. These drums are snspended in the water, and are connected up with a small battery, and through it with a tape recording instrument. As at present arranged, the operator has an aconstic apparatus connected with the drums, by means of which he hears the sounds of the bell as they are received by the drums, and, by a manual arrangement, he records each sound on the tape.

Upon the occasion of the inspection, the two punts were moored in the Thames at Kingston, about two-thirds of a mile apart, and signaling was successfully carried on from one to the other. Messages were correctly transmitted and recorded, althongh natnrally somewhat slowly, owing to the apparatus helng at present worked by hand. The trial, however, ls said to have demonstrated the practical character of the invention and the correctness of the principles upon which it is based.

New Steel Alloys.

The announcement is made in the English journals of some new alloys for the manufacture of boriog and cutting tools, the claim being made for the new substances that they possess a hardness eqnal to that of tempered steel, with the additional advantage of not iosing their hardness when heated hy friction. In the production of these valuable alloys, pig iron, ferro-manganese, chromium and tnngsten are melted together in graphite crucibles under stick charcoal and calcined horax, the tnngsten and pig iron being melted in clay crucihles together with the har iron, the nickel, copper and aluminum heing subsequently added. The metal is at this time covered with stick charcoal only, and the alloys are cast in sand molds in the usual manner. For nail-cutting hlades, cutting blades for varinus machines, cutting-out tools, and similar employments, the alloy consists of a certain combination of pig iron, Swedish bar iron, ferro-manganese, chromlum, tungsten, aluminum, nickel and copper.

Days of the Tow-Boat Over.

Electrical propulsion of commercial boats on canals is no longer a theory, but a demonstrated success. The new power was successfully tested at the viliage of Brighton, four miles from Rochester, on the waterway of the Erie canal, November 17th. The old steamboat Ceres, now the Frank W. Hawley, was fitted with an electric motor by the Westinghonse Company instead of a boiler and engine, taking power from a trolley wire overhead. She started off without a hitch or hindrance. The electric current was taken from the Rochester-street railway, and used 500 volts power. The prlnciple is the same as that of the stree-car system, except that the return current is carried overhead the same as the supply current. The lateral movement of the boat, which allows it to pass another, is provided for by using a pliable wire for a trolley. The boat made from four to seven miles an hour. It is said it was capable of towing six other hoats at a good rate of speed. If power can be obtained from Niagara, as it is suggested it can be, 50 cents per day will get the power for a canal boat that lt takes four mules and two men to give it now. That means that 2½ cents will carry a hushel of grain from Bnffalo to New York, and that 2½ cents is going to deliver it in Buffalo from Duluth. Five cents brings a bushel of wheat from the wheat fields to the metropolis.

Electric Cooking at Half Price.

Some of the London Electrical supply firms are takng very sensible and practical steps to enable the public to readiiy enjoy the advantages of electric heating, says the Chicago *Journal of Commerce*. They are not only lending out electric cooking stoves to customers, but are prepared to supply a separate meter and charge half rates for cooking, which they can afford to do, ioasmuch as the consumption takes place during the day when the dynamos must gather electricity, and when there is little demand for it for lighting purposes. Besides these ovens there are breakfast cookers, in which eggs and hacon may he cooked on the breakfast table; electric plate-warmers, which are being ordered from London clnbs, for they can he kept in the dining room without any offensive smell; electric foot-warmers, hot plates, stew pans, kettles, flat irons, ornamental screens, which act as radiators of heat and warm a room; electric curling iron heaters for ladies and electric shaving pots for gentlemen.

Electricity Fires Benzine.

A singular accident recently happened at Buda-Pesth on an electric tramway line. A carboy of henzine fell on to the roadway from a passing van and was broken, the benzine running over the roadway. A short time afterward an electric car passed, taking its electricity from an underground conductor. It is snpposed that there must have been a spark between the tramcar and the conductor, which fired the henzine, for suddenly the roadway was in flames. Happily they did not last longer than ahout ten mlnutes, but sufficiently long to set fire to the tramcar, which had stopped, and to cause a panlc among the passengers.

An Electrical Dredge.

In New Zealand the ordinary bucket and ladder dredge is giving way to the electricaily worked dredge, by reason of the heavy expense the former entails in river work, and the necessity for ponderous machinery when it is used on rocky hottoms, and where the depth exceeds 35 or 40 feet. The plant is remarkably simple, and it is proposed to spend $2700 upon the same amount of work as formerly cost $8000, hesides having more time to give to paying work in consequence of the reduction in the amount of necessary repairs. Engioeers are heglnning to realize the amount that can be saved in one year by the work of the electrical dredge, and that the work can at the same time be better done than by the style of apparatus now in use.

Useful Information.

Ships Lost at Sea.

The annual loss of ships at sea, says the *Age of Steel*, in spite of improved methods in ship-building and the higher rate of security that follows, is more appalling than is generaliy supposed. The annual amount of tonnage turned out of the shipyards of marltime nations makes a huge total, and would probably he sooner or later out of business were it not for the accidents and disasters that are daily making driftwood of sailing ships and scrap iron of steamers. The losses in 1892, as tabulated by Lloyds and recently pnblished in London, show that during last year the gross tonnage of steamships alone lost aggregate 257,048 tons. This tonnage does not include ships of less than 100 tons. There were 215 steam vessels of all nationalities that by one form of disaster or another went off the list. Of these the United Kingdom supplied 105, having a gross tonnage of 144,746 tons, representing 1.69 per cent of the total steam tonnage owned hy Great Britain. Four British vessels were destroyed by fire, ten American and four others. England lost 13 steamships hy collision, Germany 6, France 4 and other countries 8. Under the heading "wrecked," 103 vessels are tahulated, England losing 54, France 8, Central and South America 6 and the United States 4. Of salling ships the mortuary record shows a loss of 793 vessels of over 100 tons each, the total tonnage being 368,176. Of these, 104 were abandoned at sea, 152 broken up or condemned, 29 burned, 41 iost in collision, 86 reported "missiog" and 349 wrecked. The principal commercial nations contributed to this table of losses as follows: United Kingdom 144 vessels, British colonies 90, United States 117, Holiand 20, France 45, Germany 54 and Russia 14. The money iosses involved represent an enormous aggregate of wealth dumped into the lockers of Davy Jones, for which insnrance supplies hut a partial redemption. In many cases it is possible that disaster might have been avoided, inasmuch as the science of navigation and the construction of ships is at a higher point of intelligence and efficiency than at any previous time. It may he that future progress in these directions will considerably lessen the hazards of our marine. It may be reasonahly assumed that it will, but the risks to life and property at sea, however minimized, will always he a serious factor with the merchant, the underwriter and the seaman.

Remedial Use of Apples.

Chemlcally the apple is composed of vegetable fiber, albumen, sugar chlorophyl, malic acid, gallic acid, lime, and much water, says the *Practitioner*. Furthermore, the German analysts say that the apple contains a larger percentage of phosphorus than any other fruit or vegetahle. The phosphorous is admirahly adapted for renewing the essential nervous matter—lecithin—of the hrain and spinal cord. It is, perhaps, for the same reason, rudely understood, that old Scandinavian tradltions represent the apple as the food of the gods, who, when they felt themselves to he growing feehle and infirm, resorted to this fruit, renewing their powers of mind and body. Also, the acids of the apple are of singular use for men of sedentary habits, whose livers are sluggish in action, those acids serving to eliminate from the body noxious matters, which, if retained, would make the brain heavy and dull, or bring about jaundice or skin eruptions and other allied troubles. Some such experience must have led to the custom of taking apple sauce with roast pork, rich goose, and like dishes. The malic acid of ripe apples, either raw or cooked, will neutralize any excess of chalky matter engendered by eating too much meat. It is also the fact that such ripe fruits as the apple, the pear, and the plnm, when taken ripe and without sugar, diminish acidity in the stomach, rather than provoke lt. Their vegetable sauces and juices are converted into alkaline carbonates, which tend to counteract acidity.

The Physical Strain Involved in High Speeds.

The exaction that modern railroad speed makes on the physical stamina of raiiroad men is demonstrated in the fact that seven engineers are required to take the Chicago flier out and seven back, says the Boston *Transcript*. The running time between New York and Chicago is twenty hours and the average speed is 48 miles an hour. Each engineer and engine runs three hours. Machine and man return with a slow train to their starting point to relieve the strain on hoth. Then the engineer is given forty hours rest before he goes on the flier agaio. This rest is ahsolute, no work of any kind being required of the engineer. Though the average speed is 48 miles an hour, the locomotive must at some points be driven at 60 or more. The physical strain on the man in the cab at those bursts of speed is something terrihle. The engineer has fifty things to look out for, and is beiog shaken and swayed all the time. The fireman is constantly feeding the insatiate furnace. On the run of the Empire State express three tons of coal are shoveled from the tender into the furnace between New York and Alhany. It is not wonderful that the engineers of this train are given alternate days for rest and recuperation. Fast travel not only wears out rails and machines, but human creatures' lives.

Round Shoulders Cured.

A woman physician recommended to the Boston *Herald* the following simple exercises, requiring little time and no apparatus, for the cure of all except very severe cases of round shoulders, when braces are also sometimes a necessity: "1. Raise arms before you shoulder high, extend arms sidewise, throw head hack, straighten head, move arms forward, lower arms, repeat ten times. 2. Stand erect, raise arms hefore, rise on tip toes, then throw arms as far hackward as possible, sink again on heels and drop arms to side, repeat ten times. 3. Raise arms with elbow bent shoulder high, bringing palms together in front of face, then with elhows still hent swing hoth arms vigorously backward as far as possible even with the shoulders, palms lookiog forward. This should he repeated several times, hut as the positlon is somewhat fatiguing, rest or change of exercise may be made hetween the movements."

Another simple movement designed to bring ahout a correct position of the shoulder blades consists of holding a cane or wand in both hands, throwing the head

back and carrying the stick from "above the head back and down the hips."

As the clothing, if too tight or unyielding about or over the shoulders, may help to produce round shoulders, both the under and outside waist should be comfortable, and hands over the shoulder of garments made of elastic.

The Lord Mayor of London.

The fountain of municipal honor in England undoubtedly springs from the Guildhall, London, which justly claims to be accounted the most ancient of our municipal halls, seeing that the lord mayors of the last eight centuries are, with justice, assumed to have had prototypes in the Roman prefect and the Saxon fortreye or portgrave.

For a considerable number of years the robes of the lord mayor, the court of aldermen and the common councilors have been settled with a precision that none save the most reckless of innovators would presume to disturb. The lord mayor himself has his "gold" robe for the occasion of the annual Guildhall banquet and for the times when he proceeds in state either to the new law courts or to the houses of parliament. The aldermen have their scarlet gowns, the sheriffs their distinctive and very handsome robes and chains, while the common councilors rejoice in gowns called "mazarines," it being generally understood that mazarine is a term for a particular dark blue color, although, according to some lexicographers, mazarine also means a drinking vessel and an old way of dressing fowls.

Then, again, when the sovereign comes into the city the lord mayor is bound to don a robe of crimson or purple velvet trimmed with ermine. At the time of this investiture he wears a massive gold chain, but when he is honored by re-election at the expiration of his term of office he wears two chains. The mace of silver gilt, surmounted by a royal crown and the imperial arms, is carried before the mayor by the authority of the charter of Edward III. While the city possesses no less than four swords, one called the "Pearl," presented by Queen Bess when she opened the first royal exchange, and so called from its being richly set with pearls. This sword precedes the chief magistrate on all occasions of rejoicing and festivity. The sword of state is carried before the lord mayor as an emblem of his sovereignty within the city proper. The "black" sword is used on fast days in Lent and at the death of any member of the royal family, while the fourth sword is that placed close to the lord mayor's chair at the central criminal court.—London Telegraph.

Artificial Leather.

A substitute for leather, called pantasote, has come into notice in this country within the last twelve or eighteen months, says the New York *Tribune*. The composition of it still remains a secret, but the producers claim that it contains no rubber nor animal substance of any kind. It is incombustible, or nearly so, odorless when scorched, and waterproof. Cold does not render it stiff or brittle, as would be the case with some compounds; nor, on the other hand, does it soften and become sticky under the influence of heat.

Pantasote leather, as marketed, consists of two or three layers of cloth, saturated with and glued together by the secret preparation. It then has the hue of leather, without special coloring matter, and also, it is asserted, the durability of the substance which it is designed to replace. The chief use to which the new material is devoted at present is the upholstering of seats in railway cars and steamships and for decorative purposes. While leather is reported to cost 20 cents a square foot, pantasote, guaranteed to be equally strong, is sold for less than half that price.

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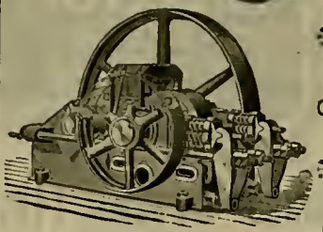

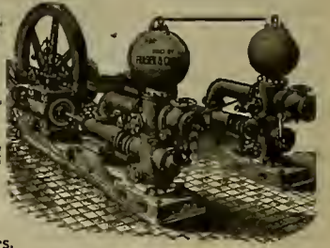

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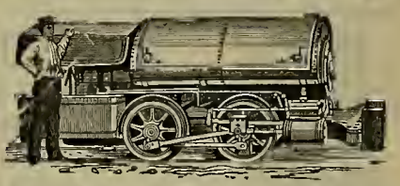

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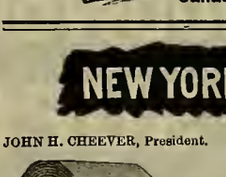

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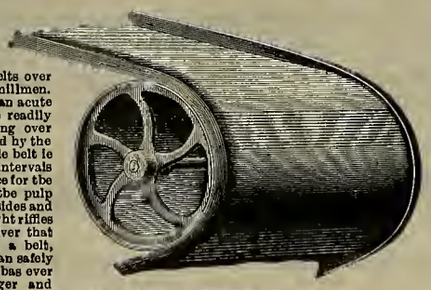

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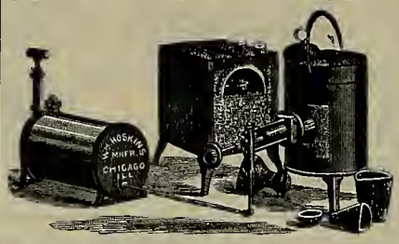

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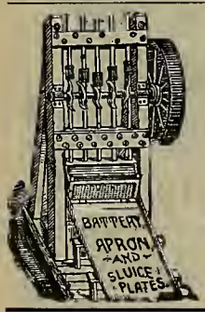

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Coast Industrial Notes.

—The Canadian Pacific quotes a Mid-winter Fair rate of $34.50 from Chicago to San Francisco.

—Work on the big irrigation dam near Modesto is progressing rapidly and the big structure will probably be completed in two weeks.

—Professor Lowe proposes to establish a meteorological station on Echo Mountain. He has ordered a complete set of instruments, which are now on the way from the East. Observations will be taken daily, beginning January 1st.

—The Santa Fe Railroad Company has a force of surveyors running a line and laying out a route for a new road to connect San Jacinto and Lakeview, a new settlement in Riverside county. The proposed road will furnish railroad facilities for a fine section of country. Work of constructing the new road is expected to begin without delay.

—The basalt block industry in Sonoma is booming. S. Schocken of Sonoma has now contracts on hand to deliver 700,000. In one week 72 carloads of blocks have been shipped to the metropolis over the San Francisco & North Pacific railway via Tiburon. This means lively times for Sonoma, as a large number of men will now find employment in the quarries, where they will earn between $3 and $5 per day.

—The Dickins-Hobart Lumber Company has been attached by the Humboldt Lumber Mill Company to recover $444. The lumber yards of the company on Berry street have also been attached. A meeting of the creditors of the Dickins-Hobart Lumber Company was held on October 4th, and J. B. Dowling was appointed trustee in the interest of creditors. The liabilities are about $21,000, and it is claimed the assets are worth about $27,000.

—The Northern Pacific railroad has ordered that all monthly salaries between $50 and $75 be cut 5 per cent; $75 to $100, 10 per cent. The reduction above $100 has already been made, but does not include trainmen, engineers, etc., and operators employed under contract. These contracts will not now be abrogated, but it is expected that the dullness of business will tend to induce such employes to accept the cut, as it was shown at the Boston international meeting of the Brotherhood of Railway Employes that the Northern Pacific employes were paid the highest scale of any in the United States or Canada.

—D. K. Trask, the receiver appointed to succeed J. F. Crank in the case of the Illinois Trust and Savings Bank vs. the Pacific Railway Company, has filed his final account and report in the Superior Court at Los Angeles. His account covers a period of seven months and twenty days. The report shows that the receipts from all sources were $201,434.02, and the total disbursements $200,042.75, leaving a cash balance on hand of $1391 27. The net earnings of the cable system during his receivership were $43,468.53, and a comparison between the first nine months of this year with those of 1892 shows an increase in favor of 1893 of $19,691.99.

—Goodall, Perkins & Co., have developed a coal mine in the Coffin tract, a new coal-field on Coos Bay, for which they paid $30,000. Within four weeks from the date of the purchase an English syndicate, which had been prospecting on the land, offered Goodall, Perkins & Co. $300,000 cash and $200,000 stock in a $1,000,000 company for the tract, which sums were declined, and the firm opened the mine on its own account. The first coal for export was taken out about three weeks ago. It turned out to be the best coal, it is claimed, ever uncovered at Coos Bay. The steamers Arcata and Arago bring down 700 tons each trip, and there is a 20 years' supply "in sight."

—A united effort will probably be made during the coming winter to induce the general government at Washington to lend aid to an irrigation proposition that will, when completed, cover a large area of what is now desert land. The plan is to build a dam in the Grand canyon of the Colorado, the framework of which will be steel of such strength as to resist any pressure that might be hurled against it during the summer floods. Above the framework bowlders will be placed as a protection, and thus it is proposed to make a sufficient fall to furnish water power for pumping the water to the plain above, where it may be carried in a big canal to the various locations where it is needed. The power will be furnished by turbine wheels, and a sufficient number of them may be brought into requisition to take out any amount of water desired.

Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Calaveras.

NEW MILL.—Sheep Ranch Cor. *Citizen*: A ten-stamp mill is soon to be erected on the Getchell gravel mine, about two miles and a half from this place. The prospects in this mine are very flattering.

Fresno.

THE SPENCER MINE. — *Republican*: W. G. Barnum was in Grub gulch last Monday and had an opportunity to investigate the Spencer mine near Fresno river, and makes an enthusiastic report of its condition. He brought down with him specimens of quartz taken from the mine at a depth of 160 feet on the incline, which makes a good showing of free gold and sulphurets, with traces of galena. The ledge is well defined along the surface and pitches into the mountain at an angle of about 45 degrees. The walls are of slate, well defined, and the ledge is from three to six feet in width. There is no vein matter whatever, but solid quartz from wall to wall, and is said to average from $75 to $100 per ton. From its characteristics, some miners think it a part of the extension of the Comstock ledge of Virginia City. Mr. Spencer, who is an old miner, has been prospecting the lode with no machinery outside of a windlass, but has a ten-stamp mill on the ground and intends to put up hoisting works on at least three points along the ledge.

Humbodt.

HUMBOLDT OIL LAND COMPANY. — *Western Watchman*, Nov. 18: This company has succeeded in getting all the machinery across the South Fork of Eel river to be set up at Briceland for renewed operations, and that the work of preparation for the new well is now going on.

It may be well at this time to review this enterprise. The Humboldt Oil Land Company holds 11,500 acres of choice oil locations, besides a number of valuable oil leases. On this as a basis the company organized, capitalizing at $1,000,000, divided into 1,000,000 shares of $1 each. The company has a well equipped boring outfit, piping, etc., costing some $6000, all in good order, has but a nominal indebtedness of a few hundred dollars. The prospect and outlook for the company are highly encouraging. Prof. H. G. Hanks, the mineralogist, as also Prof. Silliman, pronounce the crude oil obtained from natural seepage from these fields as some of the purest crude oil ever found, and they both argue that necessarily there are large deposits of oil here. In early days over 50 barrels were taken from one well in a short time, which together with the conclusions of experts leaves the matter of the richness of the Humboldt oil fields no longer a matter of doubt or speculation.

The company proposes to proceed with the work of boring systematically and are setting up the derrick at Briceland where the rock is very strongly impregnated with petrolenm, and prospect from that point. Having secured so large an area of choice location and leases it is estimated that when one good flowing well is struck the stock will rise to par, and continuing each new flowing well added will increase the value of the stock from 5 to 20 per cent. It is expected the drill will be in operation inside of 30 days.

Mono.

ON HALF TIME.—Bodie *Miner*: A draft was made last Friday evening in the force employed at the Standard mine, and since then the mill has been running only half time. In order to keep the mill running continuously it has been necessary lately to work some ore of a lower grade than would yield profitable returns, and the present move has for its object the experiment of working a higher grade of ore with a reduced force. How long the present arrangements will be continued cannot be told, everything being dependent upon the future development of the mine.

Johnny Farrell was in town this week from the Ward mine. He says the mine continues to look well, and thinks that when fully developed it will prove a big thing. A small run of ore is now being made at the mill, at the conclusion of which milling operations will be suspended for the season. During the winter Mr. Ward and two other men will remain at the mine, and next year the mill will be started earlier and will run longer than it has this year.

Nevada.

THE CENTENNIAL.—Virginia City *Chronicle*: Latest advices from Nevada City relative to the Centennial mine are to the following effect: The upper face of the second crosscut west is in splendid gravel, somewhat cemented, but giving very satisfactory gold tests—coarse gold and will pay well in sluicing. Another west crosscut will shortly be started, 100 feet farther south, which will intersect the same body of gravel, with expected improvement in both quantity and golden value. The mine is being very advantageously opened, at its best points, for active and practical sluicing operations as soon as deemed expedient. Weather colder, with a shower or so of rain but no snow.

MARBLE LEDGE FOUND.—*Transcript*, Nov. 23: A marble ledge has been discovered near North Bloomfield, and arrangements are being made to work it. The deposit is extensive and contains white marble, dove-colored and common slate. Messrs. Kallenberger, Hutchinson and Martin, of San Francisco, are the owners of this marble deposit and feel satisfied that they can find a ready market for all they can take out. The necessary machinery for cutting, dressing and polishing the marble will be put up and active work begun in a short time. This will be a new industry for Nevada county, and will give employment to a number of men. There are other deposits of marble in this part of the county, and the success of the undertaking at Bloomfield will no doubt be the means of causing some of the others to be worked.

MORE STAMPS STARTED.—*Transcript*, Nov. 22: For a number of months past the Omaha Mining Company has only been running 18 stamps in their mill. Superintendent George Mainhart informs us that Monday the additional stamps were started, making the number 28, which is the full capacity of the mill. Most of the ore going through the mill is being taken from the Lone Jack, and it is looking very well indeed, and work is still progressing in the Omaha.

AT THE EAST HARMONY.—*Transcript*, Nov. 22: One hundred carloads of gravel are being hoisted from the East Harmony mine every day, the value of which is about $2.50 per carload. A cleanup made recently, after a run of seventeen days, amounted to $3200. It is the company's intention to erect a ten-stamp mill in the spring and to increase the working force so that 200 carloads of gravel can be sent out of the mine every day.

STRUCK GRAVEL.—*Transcript*: The prospects at the San Jose drift gravel mine, on the Washington ridge, are very flattering. Recently some fine gravel has been struck, in which the gold is coarse and smooth-washed, which is a good indication that they are not far from the main channel. Several small nuggets have been found, ranging in value from $4 to $8.

STARTED UP.—*Union*, Nov. 21: Without the least jar or unnecessary friction, the splendid machinery at the Orleans mine was yesterday morning set in motion by Mr. Joseph Bennallack, who had the contract of removing the plant from its former location on the Prescott Hill claim to where it is now located on Madison Hill. The Orleans was situated about 200 yards southeast of the famous Empire mine. The character of its ore is identical with that of its justly celebrated neighbor, and there is every reason to believe, as many experienced miners claim, that it is an extension of the mother lode. The mine is owned by a strong company, of which Mr. George P. Thurston of San Francisco is a large stockholder and general manager. There is not a share of stock on the market for sale, but the company will put up all the capital necessary to develop the mine. When work was left off on the Orleans mine about three months ago by Ambrose Powning & Co. there was a good-sized ledge in sight which paid as high as $70 a ton. Mr. Thurston & Co. recently let a contract to sink a new shaft to the depth of 250 feet, about 100 feet east of the old works, also to erect the machinery. The contractors sunk the shaft 157 feet by the use of a whim, when water was encountered and work had to cease. Before the opening of spring a ten-stamp mill, which has already been purchased, will be put up, and it is expected to run through this mill all the ore taken from the mine.

HAD A GOOD TIME.—*Transcript*, Nov. 18: A large number of invited guests visited the Champion mine this afternoon to witness the starting up of the new machinery. Superintendent Fred Zeitler had made ample preparations to entertain the visitors. A fine lunch was served, with an abundance of drinkables and smokeables, and good cheer prevailed on all sides. Numerous speeches were made, the principal speakers being B. N. Shoecraft, Frank T. Nilon, Gus Kartechoke, (president of the company), William H. Martin, Fred Zeitler, Joseph Schuster, Fred Searls, J. G. O'Neill and others. The ponderous machinery was set in motion and worked like a charm, everything about it having been put up in the most thorough and substantial manner. With this plant the company will be able to sink to a depth of 5000 feet, if they so desire. For years it has been the theory of miners that the quartz ledges in Nevada mining district did not extend down deeper than 1200 or 1500 feet; that when that depth was reached the quartz pinched out, owing to the granite formation that was encountered. It is the intention of the Champion Company to test the truth or fallacy of this generally accepted theory, and that is why they have had such heavy hoisting and pumping machinery erected. They will sink their shaft a greater depth than has ever been attained in this district, and will settle to their own satisfaction, as well as others, the question of deep mining in this district.

AT THE INDEPENDENCE.—*Union*, Nov. 24: Messrs. Chavanne and Fricot, owners of the Independence mine of this place, have been rewarded for their enterprise and energy in developing their property by the contractors on Wednesday cutting a ledge over three feet in size in the tunnel which is now in 800 feet. The ledge is undoubtedly an extension of the famous Eureka and Idaho lodes, the formation and character of the quartz being identical to the above when first discovered. Messrs. Chavanne and Fricot have ample means to work the Independence.

Placer.

AWAITING MACHINERY.—*Herald*, Nov. 25: The Eclipse at Ophir is awaiting the arrival of some extensive machinery.

The Red Point is looking well, and it is reported the company will soon introduce water-power to run the big blower.

The repairs on the Mayflower mine, near Forest Hill, have been completed and work is going ahead again with a full force. The mine looks well.

Iowa Hill is now the liveliest camp in the county, and this owing principally to the fact that she has two of the best mines—the Horman and Morning Star. Both are paying big. There are also a number of smaller claims that are paying good dividends, the Big Dipper looking exceedingly well. The Pioneer mine at Damascus is running full blast and is a big help to the Iowa Hill camp.

That there is yet millions of gold in these parts has been demonstrated this summer at Dutch Flat. A great number of Chinamen, and a few white men, have been mining in the river beds on either side of that once famous mining camp, using only the historic rocker, bucket and pick and shovel. They have all made good wages, averaging from $3 to $10 a day. The heavy storms and the natural settling of the heavier material upon the bedrock have made it profitable to mine by the '49 process. A thousand men, we believe, could now make good wages mining in this simple way in the vicinity of Dutch Flat.

That hydraulicking will be in force again, and at an early date, is now almost a certainty. The impounding of the debris by the aid of restraining dams will soon be proven practicable, and the cost of the construction of the dams is not as expensive as at first thought. To this new lease of life credit is due to John Spaulding, who applied and was granted permission to build a dam at his Polar Star mine at Dutch Flat. It is now nearly completed. Messrs. Benyuard and Heuer, of the Debris Commission, inspected the dam last week and intimated that it would be satisfactory. If this experiment proves a success, there will be many such dams erected during the next year. It is the foundation of a boom in mining circles. The estimated cost of the Spaulding dam is about $1500. An evidence of the life that is brought into a mining camp by the working of even one mine was witnessed at Dutch Flat this week by a representative of the *Herald*. Thirty men were employed on the Spaulding dam and 30 men left town in the morning and returned at night, dinner buckets in hand.

AT THE DARDENELLS—Colfax *Sentinel*: The Dardenells mine at Forest Hill struck some immensely rich gravel this week. It is literally covered with gold. The mill is running steadily, and a big clean-up is expected.

The Big Dipper mine above Iowa Hill is looking better now than it has since the mine was discovered. The future prospects are very flattering, and the mine bids fair to be a bullion-producer for many years to come.

The Morning Star mine is getting better and better every day. This week the miners took out some dirt that was good for sore eyes to gaze upon. It looked as though the gold had been thrown there by the handfull. They have ground enough opened up to insure dividends for the next ten years to come.

Plumas.

THE REWARD MINE.—*National-Bulletin*: S. E. Swearingen, of Genesee, was in Quincy Saturday, and from him we learned that he was to resume work Monday on the Reward mine, owned by himself and S. Emrich, of Reno. The tunnel will be driven ahead. The face is now in solid quartz 500 feet below the surface. The ledge, on the surface, is 40 feet wide, says Mr. Swearingen. The ore prospects well in gold, silver and copper.

San Bernardino.

THE SALE OF GOLD MINES.—Contract of sale of the Gold Bug and Golden Rule mines near Grapevine Springs was filed for record Nov. 23, the consideration being $10,000. Several minor sales of gold mines in the Morongo mining district have been made.

Shasta.

MAKING IMPROVEMENTS.—*Courier*, Nov. 25: The Hidden Treasure Company is making many substantial improvements about the property below Iron Mountain. A large iron-pipe shute has been put in to run the ore down to the mill and new concentrators are to be put in soon. The mill is running only five of its ten stamps on account of the present lack of water for motive power. A force of ten men are employed there, and it is expected that a rich ore body will be encountered soon. It is the intention of the company to go ahead with the work of development in an energetic manner, and Mr. Dunbar says they intend to open up a great mine there if they have to sink down to China.

The Minnesota people are pushing work on their new mill on Spring creek above Shasta, and it is expected that the mill will be running in a couple of weeks. The mill will be a ten-stamp one, 850 pounds each. An enormous amount of ore is in sight, and the opinion of many mining men is that the Minnesota will rank second to no mine in the county. It was leased some time ago to Janney & Co. of Oregon, and the new management is prosecuting the development vigorously. A fine body of very rich ore was discovered a few days ago.

Mr. Hunt will resume work on the Skillen mine at Nigger Hill soon and will sink a shaft down on the ledge. A considerable amount of ore was crushed in the Shearer mill a short time ago with very satisfactory results, so it is reported. Mr. Hunt is a practical miner, and if more miners like him would take hold of the mines around Shasta, it would be a great thing for the district.

There are several parties looking at the Penrose claims, near Shasta. These claims are all good properties, but they are in an undeveloped state.

A custom quartz mill of five or ten stamps would fill a long felt want in Shasta. Water is plentiful, and an unlimited supply of fuel—pine, oak, etc.—grows on the surrounding hills. A splendid location for a mill is on the gulch below the old Catholic church foundation, and Mr. Fitch may put his mill there instead of at his mine.

One of the most promising ledges of this vicinity is the one owned by Thos. Spragins at Lower Springs. The vein extends north and south, and prospects well for over 1000 feet. The ledge is 3½ feet wide, and prospects high in free gold. Experienced mining men say that the mine is one of the best prospects in this section.

James. T. Hill is sacking ore from the Dol-

cothe at Lower Springs and expscts to have it milled at the Shearer mill at Salt creek.

J. C. Frick is running a tunnel to tap the old Spanish ledge, at the Bnckeye ranch. The Spanish mins is one of the best ledges in the district but lack of capital has rstarded any active dsvelopment of late years. Work will be pushsd ahead on the mine, and that a new mill will be in opsration there before long.

George Bystls and Bob Leivsay are pushing work on their mine north of Shasta, and are opening up a very promising mine. Some samples of free gold rock, which was struck a few days ago, indicate that the boys have a bonanza on their hands.

The Shearer mill on Salt creek, which has been doing some custom work the past month, is now rnnning on rock from the Cleveland, where a large body of ore was recsntly struck.

The Iler boys are working on their nsw 400-foot tunnsl on the ridge this side of the Lost Confidence, near the head of Spring creek.

Johnny Franck and partnsrs have struck soms fins ore in the old Tom Greene mins near French Gulch and stand a good show to take a fortune ont of the mine.

About thirty men are employed at the Gladstone.

NEW MILL.—Shasta *Democrat:* At Shasta, Mr. Fitch of Santa Crnz is erecting a five-stamp mill to test a mine recently purchased there.

Peter Schierer's ten-stamp mill on Middle creek has been hammering away on rock from the new ore body strnck in the Cleveland two weeks ago, with gratifying results.

The Hidden Treasure mine on Iron mountain is dropping five stamps on high-grade ore. The company is putting in concentrators and propose to put in ten more stamps soon. The water-power of Slick Rock limits them to running but five stamps at present.

At the Minnesota mine, leased by Jenny & Co. of Oregon City, located on Spring creek, they have their ten-stamp mill ready to crnsh ore. They have 1000 tons ready for the mill. The ore is high grade and if it mills free, great hopes are entertained for its fnture.

The Iler Bros.' group of mines on Iron monntain are being developed by a new tnnnel 400 feet long, which will tap their main ledge 600 feet deep. They are also running their arrastra with good results.

VAST BONY OF IRON.—Redding *Free Press:* Prof. Carr is attorney in a case now before the United States Land Office, wherein one Maxwell is contesting the claim of an Indian, who was allotted 40 acres, on the grounds that the Indian does not live npon the land, and that it is more valuable for mineral than agricultural purposes. One witness stated that a plow could not be used upon the land, as it was one solid mass of iron ore. Mr. Maxwell claims by location and purchase 160 acres of land containing iron ore of the finest quality, not including the land allotted to the Indian and for which he is contesting. This land lies in township 26, section 34, near Pit river, and about ten miles from Kennet, and it is said that the ore contained therein is of snch fine quality that horseshoes have been made from the crude material.

Sierra.

IMPORTANT QUARTZ DISCOVERY.—Plumas *National-Bulletin:* A recent and very important quartz discovery has been made in the Poker Flat mining district, in Sierra county, on the eastern slope of Mt. Fillmore, the location being about four miles sonth of the Pilot Peak mine in Plnmas. In his boyhood days, B. L. Jones passed over the spot and noticed the croppings. He mentioned this fact to T. H. Simmonds, a mining expert in the employ of C. B. Wingate of the Thistle Shaft mine. Mr. Simmonds at once secnred the services of Mr. Jones, and they went ont in search of the vein. After a long hnnt through the brush, they found it. Samples of the ore were obtained and sent to Mr. Wingate in San Francisco, who had it assayed. So well satisfied with the results was he that he ordered men pnt to work immediately to determine the extent of the ledge. The ledge, Mr. Simmonds says, is from 15 to 40 feet wide and can be traced for a mile, the distance covered by the locations made by himself and associates. It can be tapped at a depth of from 800 to 1000 feet. The ore carries a large amonnt of sulphnrets, and is what is called arsenical pyrites, or mispickel, characteristic of the central vein of the great mother lode extending through Tuolumne, Calaveras, Amador, El Dorado, Placer and Nevada connties. The same class of ore is fonnd in the Pilot Peak mine owned by Turner Bros. and others. The snlphurets will have to be ehipped and smelted. Messrs. Simmonds and Wingate will develop the property next spring. It is considered a very important discovery, and may lead to the inanguration of a big mining enterprise.

Siskiyou.

NEW MILLS.—Yreka *Journal,* Nov. 22: Three new qnartz mills are to be erected shortly in the Salmon river section, and new mining machinery is constantly received at the mines in that region since the completion of the new wagon road, the old system of packing on mnles having been a great detriment to the development of that rich mining district. More prospectors and mining experts have visited that section than ever before, and next spring and snmmer a big boom in both placer and qnartz mining is anticipated.

At Hnngry creek, in the Siskiyon foothills, on onr northern border, where considerable snow falls dnring the winter, the miners are fully prepared with snpplies to continne the work in the tunnels all winter, and by spring expect to have a large amonnt of quartz on hand for crushing.

Tuolumne.

STRIKE AT THE APP.—*Independent,* Nov. 25: The report was bronght to this city last Thnrsday night that this mine had strnck exceedingly rich rock—in fact, the piece exhibited shows largs chunks of gold sticking ont of the matrix. The qnartz rock itself is very similar to the famous Rawhide, except that the latter gold is fine and permeates the whole mass and the App mine gold is coarse and heavy. The latest find is from the new 800-foot level, and is, no donbt, a continnance of the same shoot befors found on the 700 level. This find is most interesting to the mining man, as it demonstrates the fact that gold being found in such rich quantities below what is gsnerally concedsd to be the barren zone, namely, from 400 to 600 feet, is most encouraging; but, possibly, the bowlder vein, or the mother lods proper, is not affected by ths zone in question, as in the eastern series of the mother lode, which has besn found in almost every instance in this county, Calaveras and Amador, when similar depths have been arrived at. This is what minsrs call the second make of gold, and when found is always permanent and lsting to great depths, hence their find is of the greatest importancs to prove our mines, if sxplored in depth, will be found rich, and may excel the famous mines of the northern counties, not excepting even those mines of the Grass Valley district.

THE RAWHINE.—The working shaft of this mine is now sunk to nearly 500 fest, and whsn this depth is reached a levsl will probably be rnn to tap the pay shoot. Work is being pushed rapidly ahead at the 300-foot level, and there is no abatement of the rich ore, while over one million dollare is really in sight. The ten stamps are kept constantly at work night and day, and each morning the plates and batteries have to be cleaned on account of the vast accumulation of amalgam. A new retort house is in consre of constrnction, and will be completed the fore part of next week. The euperintendent, W. A. Nevills, went to San Francisco last Tuesday, presumably with several thousand dollare' worth of bullion—two weeks' workings of the mine.

THE LAURA ANN NORTH STAR.—The shaft in the above mine is now sunk to a depth of 275 feet, and will be continned to the 400-foot level, and with the three shifts now at work that level will soon be reached. This shaft is on an even incline, which is necessary on account of the wavy vein. They now have a vein at present three feet in width, which shows free gold.

CHEROKEE.—The Last Chance mine, bonded by H. W. Williams, is located about a mile east of Cherokee. This mine was discovered in the early days, and worked down to the hard gronnd by a shaft 50 feet deep. The ore extracted paid as high as $70 per ton. The ehaft is now sunk 62 feet, while the vein matter ie about four feet wide in the bottom. The mine is now idle, the owner not having the meane to fnrther develop. If the shaft was snnk to the 100-foot level, this mine wonld show up well, with every chance in its favor of becoming a valnable property. Of course drifting and opening up on the shoot would be in order. Water can be procnred for power, with pressure of 200 feet. Formation, granite.

THE VIRGINIA.—The Virginia is in the same section as the Last Chance. The vein is small but very rich. Sulphurets value $1700 per ton; also carries free gold in paying quantities. This property only needs development to make it a paying inetitution.

THE DUFFIELD.—This mine is east again of the Virginia. A tunnel has been entered some 600 feet—a good-sized vein with sulphurets; value, $600 per ton. The mine has been etoped to snrface. Water can be had for power. Both these mines belong to the Scanavino brothers.

Yuba.

A RIVER-BOTTOM MINE.—Marysville *Appeal:* W. J. Forbes, who is the owner of the Old Industry Bar mine, situated six miles above Sicard Flat, on the Ynba river, is credited with having struck it rich. He has been nsing slnice boxes and from 30 to 40 inches of water. If the reports that have reached here are true, the eight men who have been working have made very good wages so far. Last week abont $600 was taken ont. This gold has floated down the river from some hydranlic mines years ago and is as fine as sand. The men started in to work in July and will be able to continue at work nntil the river raises abont two feet.

NEVADA.

Washoe District.

STRIKE IN YELLOW JACKET.—*Chronicle,* Nov. 23: A very rich body of ore was strnck in the Yellow Jacket mine yesterday, in the top of a raise from the 1100 level. The raise is np about 60 feet, and the ore was strnck near the east wall of the vein. The strike is of a very gratifying and encouraging character, and has every opportnnity to lead to something better. The ore already enconntered, which is gold-bearing, is exceedingly rich, and althongh there is not mnch of it in sight at present, it will cut a considerable figure in the month's ontpnt. It is also in a part of the mine where there is qnite a body of nnexplored gronnd. It is in the sonthern part of the mine abont 80 or 90 feet from the Kentnck bonndary, and there are 200 feet of gronnd above it and as much below that has never been opened. The vein is 20 feet wide at the place where the ore was fonnd. It gives the situation in the Jacket a hopefnl appearance.

THE COMSTOCK.—The reports of several Comstock mines for the week ending November 25 are as follows:

KENTUCK.—1100 level—The west crosscut from the sonth lateral drift is in 23 feet; face in porphyry and qnartz. Have resnmed work in the main sonth drift.

OCCIDENTAL.—During the week we have extracted from the west ledge above the 400 level abont ten tons of ore of the average value as per car samples of $54 per ton.

GOULD & CURRY.—200 level—West crosscnt 5 started in northwest drift 432 feet from main west drift has been advanced 9 feet during the past week; total length 765 feet; face in hard porphyry.

HALE & NORCROSS.—1300 level—We continne stoping out ore from the winze below this level, and extrscted during the week 37 cars of ore assaying $30.88 per ton per car sample, and 12 cars of ore, average assay per car sample $22.31 per ton.

CON. CAL. & VA.—1650 level—The drift running north from the foot of the npraise on the sill floor of this level has been extended during ths week 35 feet, total length 115 feet, continuing in porphyry and clay with an increase of qnartz which has some valne. The drift running north (at a point 52 fest down) from the winze sunk from ths west crosscut from the main northwest drift has been extended 10 feet, total length 100 feet, in porphyry, clay and quartz. The crosscut running east from this north drift—at a point 40 feet north from the winze—has besn extended 33 feet, total length 93 fest, continning in porphyry, clay and qnartz. The work of cutting out and timbering the 1000-foot station in the Con. Virginia shaft has been completed, and we are now about ready to commence drifting therefrom.

MEXICAN.—1485 level—The upraise started at a point 40 fast from the main north lateral drift and 100 feet north from the south line of ths mine has been carried up during the week 14 feet, total height 15 feet, continuing in a formation of porphyry, clay and quartz. Have continued jointly with the Ophir Company the work of making repairs in the Ophir shaft.

OPHIR.—1465 level—The crosscut running west from the main north drift at a point 124 feet eouth from the winze station and abont 300 feet north from the main shaft station has been extended dnring the week 23 feet, total length 191 feet, continuing in porphyry which carries streaks of quartz.

SIERRA NEVADA.—The south lateral drift from the intermediate tunnel has been advanced 20 feet, total length 240 feet; face in porphyry. The joint Sierra Nevada and Union north drift from the west drift, 1520 feet west of shaft, 900 level, is out 18 feet, total length 242 feet; face in small stringers of clay and quartz.

POTOSI.—The east crosscut 200 feet north of south line, 750 level, is ont 96 feet; face in porphyry and low-grade quartz. The north drift 35 feet above the 1100 level is out 80 feet; face shows bnnches of fair-grade ore. The sonth drift, 200 feet east of the Potosi winze, 1100 level, is out 42 feet, following a two-foot streak of qnartz that gives low assays. Discontinned the extraction of ore on the 17th. Shipped to the United States mint, Carson, 388 pounds crnde bullion.

CHOLLAR.—The north drift, 100 level, is out 170 feet; face in porphyry and low-grade qnartz. Are repairing the west drift, 100 level, and making the usual repairs in the main incline below the 930.

Riley District.

ANOTHER EL DORADO.—The *Record* eays Pioche is on the eve of another stampede equal to that which occurred when news of gold discoveries at Fergnson district were first reported. This time the scene is laid four miles west of the ranch of Robert Logan, in the Muddy. Reports of almost fabnlonsly rich finds have reached town, and quite a nnmber of onr townsmen have left for the new diggings. It is called the Riley district, from the fact that a prospector by that name has been working there for some time. The snrface there is a hard gravel cement, gold qnartz being found below the cement, which differe in placee in thickness. High assays are reported, and a rnsh from sonthern Utah and northern Arizona has already set in.

ARIZONA.

SUCCESSFUL LEACHING.—Cor. *Enterprise:* The leaching process of the Arizona Copper Company, started in Clifton on the 22d of last month, has proved a great snccess. A few drawbacks have been overcome with ease. There were worked 1650 tons of concentrates which prodnced 70 tons of copper, only less than half of one per cent of metal remaining in the tailings after being leached. The plant has a capacity of 100 tons daily and will probably be increased. An electric plant is to be pnt in to precipitate the copper. At present scrap iron is nsed which is procured in San Francisco. It takes abont one ponnd of scrap iron to precipitate one of copper. It is stated on good anthority that Wm. Church, for the Detroit Copper Company, will also pnt a leaching plant at Morenci in addition to the one in Clifton. The Clifton and Morenci smeltere have turned ont a great deal of copper lately, last month's run being the largest of either company.

NEW MINES ACQUIRED.—Phœnix *Herald:* Organizer Alley of the Phœnix Mining Company has secnred control of the Neshakaty and Colnmbia mines, adjoining the Phœnix property, and will develop them fully before turning them over to the company. The Neshakaty is an extension of the Phœnix mine and is equally rich in gold. It has been developed sufficiently to show a big vein and make it a valnable property. The Phœnix mine is turning ont lots of ore and when the mill is ready there will be hnndreds of tons on the dump to keep the stamps going incessantly. The work on that property is being done on levels and drifts and shows an immense deposit of ore. The mill is fast nearing completion and it is now expected that the hnndred stamps will begin dropping about the first of December.

BIG PROPERTY.—Phœnix *Herald:* Messrs. C. H. Gray and E. H. Hiller have been offered and have refnsed $5000 cash for a bond on their Arica gronp of gold mines, by an English syndicate, with further payments amonnting in the aggregate to $100,000.

With the same mail that bronght this offer came advices from ex-Sheriff Gray, who is working a force of men on the mines, that ths "Arica" is widening out and growing richer at every blast, being down now 66 feet and widening at the rate of two feet psr day.

As offsrs have been made for this propsrty from Dsnver, San Francisco and Los Angeles parties, it would sesm that the fame of the Miner is becoming noted, and, from all reports concerning it, the favorable reports are justified, not only because of the large amonnt of ore in sight, bnt of its great richness, ranging from $50 to $300 per ton, with streaks of ore running into the thousands, and all of it free milling.

FINE SILVER PROPERTY.—Kingman *Miner,* Nov. 11: Robert Gray has just finished his work on the Blne Bell mine, on Stockton Hill. In the Blne Bell Mr. Gray has a magnificent silver property. There are fonr shafts on the ledge sunk to an avsrage depth of 40 fest, and all showing a good grade of ore. The ledge is abont eight feet in width, and shows from two to four fest of solid ore fully 1500 feet in length. This ore body will mill abont 40 ounces silver and nearly an ounce in gold per ton. No better prospect can be found in the county than this. Should silver go np, Mr. Gray will realize a nice little snm of money from this mine.

The Blackfoot is tnrning out a great deal of rich ore, and will soon send in a carload to the sampler. The main tunnel is 200 feet nnder the hill, and a winze ennk to a depth of 40 feet from the tunnel level. From the bottom of the shaft a drift has been run north a little over 40 feet on ore running abont 600 ounces silver, 3 ounces gold and 15 per cent lead. The streak is abont eight inches in width. East of the shaft the ore is being stoped to the tunnel level. The mine presente the best ehowing of all claims in the hills outside of the Nighthawk mine.

The tunnel on the Miner's Hope is almost to the ledge. It will tap the vein at a depth of nearly 200 feet. The Hope is a good mine and is capable of producing large quantities of valuable ore. Robert Gray, of Stockton Hill, is the owner.

Work has been commenced on the Ark mill. Several men were taken to the mine Monday to begin preliminary work. Steam was up at the hoisting plant Tuesday, and water was being pumped ont of the main shaft. The new boiler will soon replace the old one, and then some work will be done on the mine.

A. M. McDuffee has had a carload of ore from the Rainbow mine worked at the sampler this week. Mr. McDuffee has one of the best lead properties in the county in the Rainbow, and, should capital be induced to purchase and pnt np reduction works near the mine, it wonld give employment to qnite an army of men.

The Gold Bng mine is now working 25 men.

J. C. Potts went out to White Hills this week to look after his mining interests there.

A carload of White Hills ore was ehipped to Pueblo yesterday by the White Hills Company.

A Mr. Marshall has made an important strike on the Norma mine, White Hills. The ore is said to be the richest ever taken from that property, and the pay streak is larger than any heretofore opened np.

IDAHO.

WORK AT THE STEMWINDER.—Wardner *News:* The Stemwinder mine and mill has been recently leased to James Cronin and Peter Cunningham, who at present employ ten men on development work. The proepecting that was in progress by the company when the mine was closed down last April is now reeumed and carried on in accordance with the plans then laid down. Favorable developments would canse the force of men to be increased to sufficient nnmbers to rnn the mill continnonsly.

OREGON.

MINING NEWS.—Jacksonville *Times,* Nov. 17: The placer miners are ready for the winter's rnn.

A great deal of prospecting is still going on in sonthern Oregon, and some discoveries which promise well are being made.

The Sterling Mining Co. still has a good supply of water, and has been engaged in piping for several months past, something never known before in the history of the mines.

Lindley & Co., of California, who purchased the Lncky Bart mine on Sardine creek some time since, have pnt np a first-class mill, which is running steadily on good ore. This promisee to be one of the best pieces of mining property in sonthern Oregon.

UPPER GRAVE CREEK MINES.—Rogne River *Courier:* Geo. Cronk reports good prospects among the placers on Upper Grave creek. Blalock & Son, he says, have struck a splendid ledge of copper, gold and silver on Onion creek. Abont 200 men are employed on the big ditch np there. The laborere get $1.75 a day and board themselves. The promoters of the project have established a commissary and sell groceries, etc., to the men. The ditch is to be 15 miles long, and, when complete, will have fully half a mile of perpendicular pressure. This is liable to tear things on Grave creek this winter.

Surveyor G. I. Brown spent a few days last week snrveying mining claims down Rogne river. He reports the Bybee placer almost ready for work with two monitors in position. Big apples 16 inches in circnmference ornamented the lnnch baskets on the expedition, and Mr. Brown thinks that conntry is good for other pnrpoees besides gold-mining.

Green Bartlett wae in from Deer creek Monday. He talks of erecting smelting works on his Preston Peak ledge, ae that is the only way the ore can be handled. The vein is 30 feet wide and the ore assays 80 per cent of copper and $15 per ton of gold. Work hae been snspended ont there this year on account of the snow.

SALE OF THE HAMMOND TRACT.—Ashland *Tidings,* Nov. 17: The sale of A. P. Hammond's tract of 82 acres, adjacent to the claims of the

Golden Fleece Company north of town, where the Hnntington mill is being set np, was consnmmated this week. The pnrchase was made by Geo. S. Sanford, who is here, and he bnys for himself and three capitalists of Long Island City, N. Y. His associates are Matthew J. Goldner, president of the Jackson & Vernon Ave. Improvement Co., M. F. Claven and Horatio S. Sanford, the latter of whom is mayor of Long Island City and one of the proprietors of Sanford's patent medicines. The price paid for the 82 acres was $2500. The same gold-bearing vein or dyke which the Golden Fleece Company is preparing to work, is located across this property, and it is the intention of the pnrchasers to put np either a Hnntington mill or a stamp mill at once. The plan is to pnt their mill below the Golden Fleece mill and nse for power the same water from the Anderson mining ditch.

The Golden Fleece mill will soon be rnnning, and a test made which will either encoursge or depress the high hopes entertained of an extensive mining industry from the beginning in this new direction started by Hill & Shannon.

It is reported from Gold Hill that Morton Lindley has struck a rich pay chnte in a new place on the Lncky Bart claim, on Sardine creek, and that the property is showing np well.

Fitch, Davis & Cardwell, who pnt np a Hnntington mill on their mine near Willow Springs, will add a concentrator to the machinery and start it in operation again this winter.

NEW MILL AT WORK.—Baker City *Democrat*, Nov. 20: Yesterday morning the stamps of the custom qnartz mill at the old Grayson mill site in Wilovale addition began dropping nnder the skillful snperintendence of manager E. P. Torrey.

The stamps were dropping on ore from the Emma, or old Kane mine, in the Virtne district, samples of which prospect well. All over ten ton lots will be worked at $5 per ton.

Market Reports.

The Markets.

SAN FRANCISCO, Nov. 29, 1893.

The silver market has been uneventful during the week. Quotations have varied hut slightly in New York, and in London there is a net loss of ⅛d. The feature of the week in metals has been the strong advance in copper. Last Saturday the quotation was $ro per hundred, and these figures were maintained Monday and Tuesday. The publication of the proposed new tariff, placing copper on the free list, seems to have had no effect. Lead is weak.

Silver and the Metals.

NEW YORK, Nov. 29.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.	Copper.	Lead.	Tin.
Thursday	32⅛	69⅜	9 80	3 37½	20 65
Friday	32⅛	70	.....	3 37½	20 65
Saturday	32⅛	69¼	ro oo	3 30	20 65
Monday	32⅛	69¼	ro oo	3 30	20 65
Tuesday	32⅛	69¼	ro oo	3 30	20 50
Wednesday	.....	....	.....	....	.....

San Francisco Metal and Coal Market.

ANTIMONY.		**QUICKSILVER.**	
Per lb	— @ 13	Home trade, pr. flask	40 50 @41 00
BORAX.		**STEEL.**	
Refined, in car lots	— @ 7½	English, lb	— @ 18
Powdered, do	— @ 7½	Ounton tool	— @ 8½
Concentrat'd, do	— @ 6½	Sl'k Diam'd tool	8½@ 15
All grades jobbing at advance.		Pick & Hammer	6½@ 10
COPPER.		Machinery	4 @ 5
Bolt	23 @ —	Tos Oak	— @ 4½
Sheathing	23 @ —	**TIN.**	
Ingot, jobbing	— @ 20	Spot ℔ lb	21½@ 22
Do, wholesale	15 @ 16	**COAL.**	
IRON.		SPOT FROM YARD—PER TON.	
Bar, base	— @ 2½	Wellington	$8 00
Norway, base	— @ 4½	Greta	7 50
PIG IRON.	Spot.	Nanaimo	6 50
Eglinton ℔ ton	—@—	Gilman	5 00
Glengarnock	27 00@—	Seattle	6 50
Am. Soft, No. 1	25 00@—	Coos Bay	5 50
Shotts No 1	27 00@—	Cannel	9 00
Puget Sound	—@—	Egg, hard	12 00
Olay Lane White	30 00@—	Wallsend	7 25
Langloan	27 00@—	Scotch Splint	8 00
Gartsherrie	27 00@—	Brymbo	7 50
Barrow	—@—	West Hartley	7 50
Cargofleet	—@—	TO LOAD—PER TON.	
LEAD.		Australian	5 50@—
Pig	— @ 4½	Liverpool Steam	6 87@—
Bar	— @ 5	Scotch Splint	7 00@—
Sheet	— @ 6	Cardiff	7 00@—
Pipe	— @ 5½	Lehigh Lump	10 00@—
SHOT.		Cumberland	8 50@—
Drop, sizes *smaller* than B, ℔ sag of 25 lbs	$1 75	Egg, hard	9 00@—
Do do, B and *larger* sizes ℔ bag of 25 lbs	2 00	West Hartley	7 50@—
Buck, Balls and Chilled do, ℔ bag of 25 lbs	2 00	**COKE.**	
		English, to load	$9 50@10 00
		Do, spot, in bulk	—@12 00
		Oo, in sacke	—@14 00
		Cumberland	9 50@—

Mining Share Market.

SAN FRANCISCO, Nov. 29, 1893.

The Comstock market has failed to hold its own during the week. Yesterday there occurred a bad break. The selling was not confined to local dealers, for brokers who have agencies in Nevada sold heavily, and it looked as if people up that way were getting out. The volume of business was very large and the brokers must have made fat commissions.

In the Pacific Board at the morning session Epstein was notably a large seller. Con. California fell to $4@3.95; Best & Belcher to $2.50; and Yellow Jacket to $1.30. At the subsequent informal session prices had a further decline. Con. California fell to $3.65; Best & Belcher to $2.40; and nearly all the others went lower in proportion.

To-day the market opened steadier, under decreased offerings, the filling of shorts and the buying back of stocks sold at a profit a few days ago, hut the aggregate of the business done was small, and it looked as if much of the steam had gone out of the situation. At the 9:30 session Con. California sold at $3.60 up to $3.75, Best & Belcher at $2.40 to $2.45, Ophir at $r.75, and most of the others were steadier.

At the second session there was a small building up of prices among the "chipping" fraternity, but toward noon the market became weaker.

An event of the week has been the visit to Virginia City of James Rule and Herman Zadig, the well-known broker.

Drifting on the 1000 level of COR. Virginia was begun on Sunday, and will be pushed ahead as rapidly as possible. It will pass through virgin ground, and the price of the stock is quite likely to show numerous fluctuations before the 60 days' time it is expected to take to run the drift will have elapsed.

Board Sales of Mining Stocks.

S. F. Stock Board.

WEDNESDAY, November 29, 1893.

9:30 A. M. SESSION.

300 Alpha	15c	100 Mexican	1.15
600 Andes	55c	300 Occiden al	15c
200 Belcher	80c	650 Ophir	1.75
950 B & B	2.40	100 Overman	40c
20	2.45	600 Potosi	90c
350 Challenge	75c	50	95c
100 Con. Cal. & Va	3.60	100 Savage	90c
200	3.65	100 Scorpion	10c
400	3.70	200 Sierra Nevada	1.40
50	3.75	50	1.45
500 Con New York	10c	100 Seg Belcher	20c
250 Crown Point	80c	200 Silver Hill	5c
200 G & Q	1.25	350 Union	1.15
450 H & N	85c	400 Utah	15c
1000 Justice	15c	500 Yellow Jacket	1.35
300 Kentuck	25c	100	1.40

2:30 P. M. SESSION.

600 Andes	50c	100 H & N	85c
300 Belcher	75c	400 Iowa	5c
100 Best & Belcher	2.45	1100 Kentuck	20c
250	2.40	200 Mexican	1.15
100 Bodie	30c	100 Ophir	1.75
100 Bullion	45c	500 Savage	95c
100 Challenge	80c	40	1.00
300 Chollar	75c	50 S Nev	1.40
200 Con New York	10c	500	1.35
280 Con. Cal. & Va	3.75	200 Union	1.10
100 Crown Point	80c	500 Utah	15c
50	85c	200 Y Jacket	1.35
200 Gould & Curry	1.25		

Notices of Recent Patents.

Among the patents recently obtained throngh Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

GAME APPARATUS.—Wm. W. Lapham, S. F., Cal. No. 509,316. Dated Nov. 21, 1893. This is a game of the portable or pocket class. The object of the invention is to provide for a construction that can he easily folded into a small and convenient size so that it can be carried ahont in the pocket and readily unfolded for use. The game apparatus consists of concentric tnhular casings, playing men honsed in the inner casing and a flexible board wrapped aronnd the exterior of the inner casing and lying hetween it and the onter casing.

VEGETABLE OR FRUIT CRATE.—Harvey E. Bullock, Oakland, Cal. No. 507,991. Dated Nov. 7, 1893. The object of this invention is to provide a means for storage and transmission of delicate, perishable frnits, and other similar substances, and it consists in snbdividing the containing spaces, and thus separating the articles from each other to any desired extent, and at the same time establishing a perfect ventilation throngh the whole crate. The crate is preferably made with two closed sides, the other two sides and ends being covered with wire ganze or perforated plates for ventilating purposes, while the interior of the crate has supplemental strips with holes which are adapted to receive the bent ends of transverse rods. These rods snpport the removable and adjnstable shelves which extend across the case and enable the packer to place these shelves at any distance apart snd nse as many as may he desired, depending upon the character of the fruit or other article to he packed therein.

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ASSESSMENTS.

COMPANY AND LOCATION.	No.	AMT.	LEVIED.	DELINQ'T AND SALE.	SECRETARY.
Alta S M Co, Nevada	44	10c	Nov 10,	Jan 4, Jan 23	J E Jacobus, 309 Montgomery
Belcher S M Co, Nevada	47	20c	Nov 3,	Dec 7, Dec 28	O L Perkins, Mills Building
Best & Belcher M Co, Nev	55	25c	Nov 1,	Dec 5, Dec 22	L Osborn, Nevada Block
Butte Belle G M Co, California	1	5c	Oct 11,	Nov 15, Dec 6	Chas H Ford, Crocker Building
Challenge Cons M Co, Nevada	15	5c	Oct 10,	Nov 14, Dec 5	O L McCoy, Mills Building
Chollar M Co, Nevada	38	10c	Oct 9,	Nov 14, Dec 7	Chas E Elliot, 309 Montgomery
Con Wyoming G M Co, Nev	3	5c	Oct 3,	Nov 13, Dec 2	W J Gurnett, 308 Pine
El Leopoldo G & S M Co, Mexico	4	1c	Oct 26,	Dec 1, Dec 18	Jabez Howes, 214 Pine
Gould & Curry S M Co, Nev	72	10c	Oct 14,	Nov 16, Dec 7	Alfred K Durbrow, Nevada Block
Gray Eagle M Co, Cal	34	5c	Oct 11,	Nov 23, Dec 19	Chas C Harvey, 309 Montgomery
Jack Rabbit M & M Co, Cal	5	3c	Nov 1,	Dec 2, Dec 22	Chas Wetzel, 320 Sansome
Julia Cons M Co, Nevada	25	5c	Oct 23,	Nov 23, Dec 19	J Stadtfeld, 309 Montgomery
La Grange Ditch & Hy M Co, Cal	9	25c	Nov 10,	Dec 18, Jan 8	A Halsey, 328 Montgomery
Martin White M Co, Nevada	29	25c	Aug 31,	Oct 26, Dec 14	K L Ross, 120 Sutter
Occidental Cons M Co, Nevada	14	10c	Oct 9,	Nov 13, Dec 4	Alfred K Durbrow, Nevada Block
Overman S M Co, Nevada	69	10c	Nov 10,	Dec 14, Jan 4	Geo D Edwards, 414 California
Potosi M Co, Nevada	40	25c	Nov 13,	Dec 15, Jan 4	Chas E Elliot, 309 Montgomery
St John Quartz M Co	8	5c	Oct 14,	Nov 15, Dec 2	J M Wiley, Grass Valley
Teresa Mining Co, Mexico	12	10c	Oct 27,	Dec 7, Dec 23	K J Willats, Flood B'd'g
Yellow Jacket S M Co, Nev	58	25c	Nov 16,	Dec 21, Jan 27	W H Blauvelt, Mills Bldg

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE
Head Center & Tranquility M Co	Annual	J W Pew, 310 Pine	Dec 12
Jupiter Gravel M & W Co	Annual	W A Keefer, 14 Grant Av	Dec 4
Mexican G & S M Co	Annual	Chas E Elliott, 309 Montgomery	Dec 5
San Vicente M Co	Special	A H Ricketts, Crocker Bldg	Dec 5
Union W L M & M Co	Annual	W A Keefer, 14 Grant Av	Dec 4

Cal. Debris Commission Notices.

NOTICE—THE CALIFORNIA DEBRIS COMMISSION having received petitions to mine by the hydraulic process from John Spaulding, in the Polar Star mine near Dutch Flat, and to deposit tailings behind a dam in Little Bear River: from Nathan Gardiner in the Red Hill mine near Ono, Shasta Co., and deposit tailings behind dams in Wash Pan Gulch; from A. Denmire, in the Denmire mine near Gold Lake, Sierra Co., to deposit tailings in an old hydraulic pit, gives notice that a meeting will be held at the office of the Commission, room 92, Flood Building San Francisco, on December 12th, 1893, at 1:30 P. M. On or before this hour and date all parties interested may file affidavits, plans and maps, in support of their respective claims. By order of the Commission. W. H. Heuer, Corps of Engineers, U. S. A., Secretary of the Commission.

Assessment Notices.

GOULD AND CURRY SILVER MINING COMPANY.—Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Trustees held on the fourteenth day of October, 1893, an assessment (No. 72) of Ten Cents (10c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the company, Room 69, Nevada Block, 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 16th day of November, 1893, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on THURSDAY, the 7th day of December, 1893, to pay the delinquent assessment, together with the cost of advertising and expenses of sale. By order of the Board of Trustees.

ALFRED K. DURBROW, Secretary.

Office—Room 69 Nevada Block, No. 309 Montgomery street, San Francisco, California.

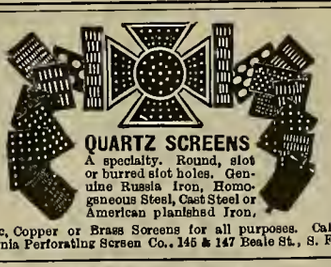
CO-OPERATIVE PRINTING CO., 408 Sacramento St., S. F., Cal.

Notice is hereby given that at a meeting of the Directors, held on the 22d of November, 1893, an assessment of $2 per share was levied upon the capital stock of the Corporation, payable at the office of the company, to the Secretary, on ths 22d day of December, 1893.

Any stock upon which this assessment shall remain unpaid on the 22d day of December, 1893, will be delinquent and advertised for sale at public auction, and unless payment is made before will be sold Monday, the 8th day of January, 1894, at the office of the company, at 1 o'clock P. M. of said date, to pay the delinquent assessment, together with the cost of advertising and expenses of sale.

MORGAN BACKUS, Secretary.

Office—408 Sacramento St.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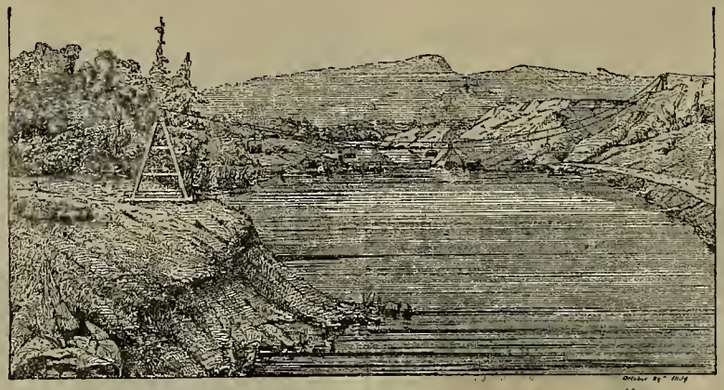

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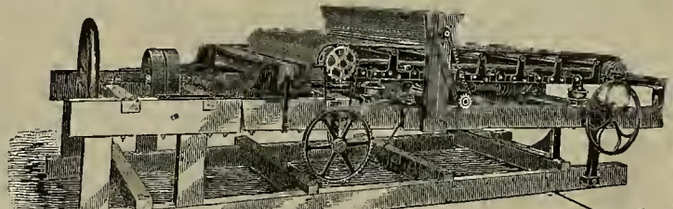

FALLS MINE, IGO, SHASTA CO., CAL., May 25th, 1893.

MR. THOS. McGLEW, President McGlew Ore Concentrator Company—Dear Sir: I take much pleasure in endorsing your very superior Ore Concentrator. When I was requested to examine your concentrator, I did so under protest, declaring that I would have none other than a True, as after many years experience with different concentrators, I believed them to be the best.

Now, after a thorough trial of the McGlew Ore Concentrator, on ores difficult of concentration, I emphatically pronounce it the best concentrator of any I have ever used in benefiting my ores. It is doing CLEANER and CLOSER work than I had believed possible for any concentrator to accomplish.

Samples of pulp and tailings, taken every hour, dried, mixed and assayed, show * * * from West ledge, a saving by your concentrator of 94½ per cent; from East ledge, * * * a saving of 92 per cent.

The concentrator runs very easy and requires but slight attention. One men attends to rock-breaker, crusher and concentrator.

You have a good concentrator, and it can be relied upon to handle any ore that will concentrate. I most heartily recommend it to the mining public. Yours respectfully,
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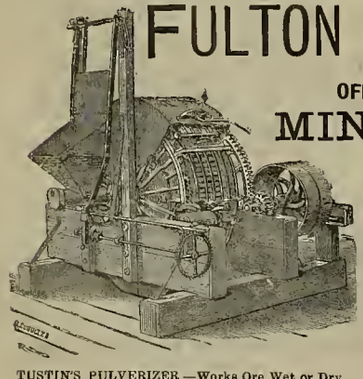

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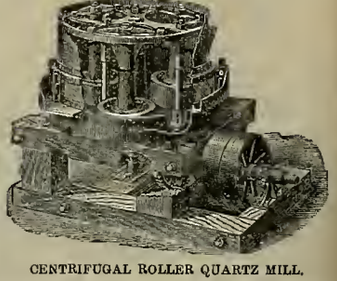

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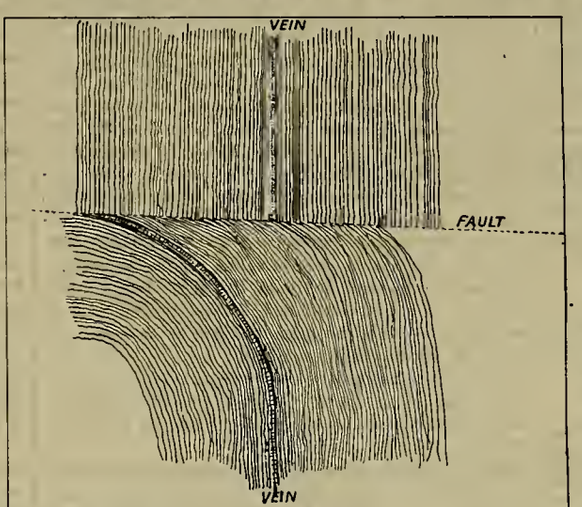
Faults in California Mines.

By W. H. Storms, Assistant in Field, in Eleventh State Mineralogist's Report.

The formation in which the Coyote vein, in San Diego county, has formed is micaceous and hornblende schist and gneissoid rock. Hornblende granite and dykes of diorite also occur in the vicinity of the vein. The Coyote mine is a quartz vein from two to four feet in width. The rock is iron-stained and occasionally shows free gold. The vein is developed by two shafts—one about 20 and the other nearly 80 feet in depth—and strikes 5° north of east, having a dip of 46° to the south. The vein appeared to cut the formation at a small angle. A fault, which has occurred within the vein, had evidently puzzled the owners, as at the bottom of the 20-foot shaft they had developed eight feet of what looked like solid quartz. The vein is really but four feet in width at that point, but the fault, cutting downward at an angle of 45° and crossing the strike of the vein at an angle of 27°, had allowed the hanging-wall side of the fault to slip downward, thus doubling the width of quartz, which was much shattered. The miners had quit work, leaving what they considered well enough alone. In the deeper shaft the fault had carried the hanging-wall down and to the east a few feet, and the vein was lost altogether. A short drift had been run into the hanging-wall, but, not finding the vein, work had been suspended. The vein lies on the footwall side, and not more than four or five feet from the line of the slip.

One of the most interesting mines in Los Angeles county is located in the rugged mountains about eight miles from the town of Azusa, in the San Gabriel canyon. It is commonly known as the Kelsey mine, and has become famous as a producer of silver ore of fabulous richness.



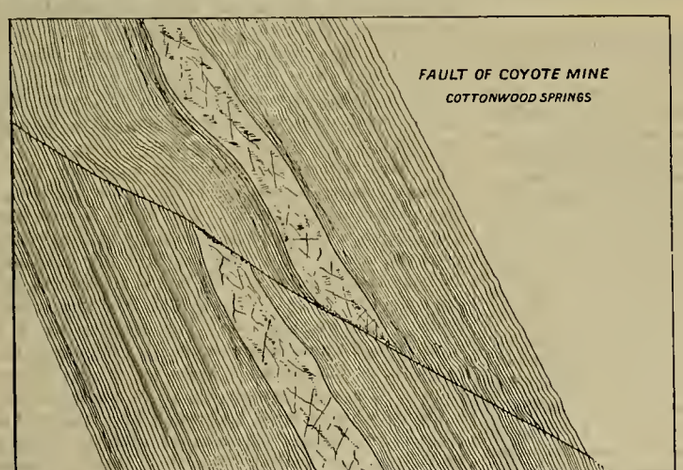
FAULTING AND TORSION OF THE KELSEY VEIN

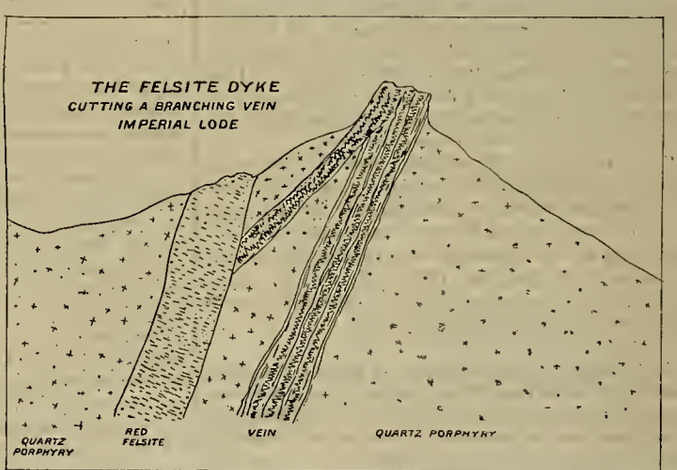
The country is made up almost entirely of metamorphic rocks, having schistose, gneissoid, and massive structure. Both hornblende and mica occur in these rocks abundantly, the former being frequently altered to chlorate, or by further change to epidote. Dikes of porphyritic rock have been intruded into the crystalline schists. In the immediate vicinity of the Kelsey vein are intrusions of a dark green, much decomposed and shattered rock, probably diorite. Faults, great and small, are numerous throughout the region. Within a few hundred feet of the mine is a great fault which may be plainly seen cutting the mountain. The displacement must reach many hundreds of feet. It has resulted in bringing in contact on a horizontal plane, rocks of entirely different character. On the south side of the fault the rocks are made up of quite regularly bedded micaceous sandstones, more or less schistose, and having a prevailing buff or light gray color. These rocks dip east at an angle of 20° to 30°. On the north side of the fault the rocks are harder, of a dark gray color, and containing considerable hornblende. These rocks are more gneissoid and massive than schistose. The dip is much less regular than on the south side of the displacement. Large, lenticular masses of quartzose and feldspathic rock are of frequent occurrence in the hornblende gniess, evidently the result of the segregation of the contained minerals. On the whole there is much more evidence of the disturbance on the north side of the fault than on the south side. It is in this area of greatly disturbed strata that the Kelsey vein has formed.

The vein is of the fissure type and occupies the line of a fault plane, that at first, perhaps, was a mere crack, but which has become enlarged by the movement upon themselves of the rock masses forming the walls, resulting in a grinding and crushing of the rocks by the attrition and pressure incident to this movement. Into this crevice mineral waters found their way, carrying in solution the minerals now constituting the vein.

The third illustration shows a curious formation in San Bernardino county, on the Imperial lode. At one point on the course of the vein, where it is joined by one of the branching spurs, the felsitic dike has intersected the smaller vein. The occurrence is plainly seen in a cut made at this place, where rich ore was found.

It will be noticed that both the main vein and the spur occur in the quartz porphyry, and that the red felsite cuts the smaller vein. The displacement on the surface along the strike of the vein is nearly 40 feet. This does not show in the cross-section.





From an advance copy of the annual report of the United States Chief Engineers for 1893 it is learned that Chief Casey concurs in Col. Mendell's report that the entrance to the Golden Gate is perfect and needs no improvement. Recommendation is made that $152,000 be appropriated for the channel work in the San Joaquin river, and $9100 is recommended for snagging work in the Mokelumne. An appropriation of $345,000 is asked for the Sacramento and Feather rivers; during the past fiscal year there was expended on these rivers $22,856. Major Heuer reports adversely regarding the proposed improvement of the San Joaquin between Hill's Ferry and Firebaugh's Ferry, and against the proposed improvement of the Stanislaus, Navarro, Merced and Tuolumne rivers. Congressman Caminetti, who is a member of the Congressional committee on commerce, is still engaged in personally inspecting the rivers and harbors of the State.

The revival of the Virginia (Nev.) *Territorial Enterprise*, after some months' suspension, is worthy of note. Time was when, in a minor way, the *Enterprise* was as much of a bonanza as the Comstock itself. Its decadence dated from the decay of the great interests of which it was the leading exponent, and its resurrection from the newspaper graveyard is no less a surprise than would be news that the halcyon days of Con. Virginia had come again. Myriads of memories of Nevada journalism cluster round the old *Enterprise*, and every newspaper man on the coast will be glad to chronicle the event of its resuscitation.

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San Francisco, December 9, 1893.

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MINERAL exhibits for the Midwinter Fair will be carried by the Southern Pacific Railroad Company free of charge from points west of El Paso, Texas; Deming, New Mexico; Ogden, Utah; south of Portland, Oregon; and north of Mojave.

DURING the week Westall & Hughes have been granted a license by the Debris Commission to work the New York mine, in Sierra county. Permission was also granted the Quincy Water and Mining Company to build four restraining dams at the Spanish Ranch mines in Plumas county.

UNDER the provisions of the proposed tariff bill, it transpires that there would be an annual deficit of $60,000,000. It is proposed by those in charge of the matter that an income tax be made to supplement the deficiency. Light has not yet broken on that phase of the financial darkness. The situation calls to mind the inscription on the tombstone in the Pike county cemetery: "Here lieth the mortal remains of Jos. Bowers; he was well; he would be better; he took medicine——and here he is."

SENATOR JONES, of Nevada, says that his observation of financial affairs confirms him in the opinion expressed by himself and other silver advocates prior to the passage of the bill repealing the Sherman purchasing silver act, that there will be no material revival of business because of that action by Congress. He says that he does not expect to see any legislation which will materially benefit silver during the present administration.

ELSEWHERE in this issue appears a communication entitled "Advertise Your Mines," printed as received from an experienced mining man now resident in San Francisco. It is given place for the truths it contains, and, primarily, because it voices the beliefs of a good many correspondents who lack the facility of expression possessed by the author of the article to which we refer. The subject is an interesting one, and of present import to hundreds of people, who, whether they agree or disagree with "Investor," will note that, in some degree at least, his experience is coincident with their own.

IT is estimated that Colorado's gold product will aggregate $9,000,000 this year—an increase of nearly $3,500,000 over that of last year. The most of the Colorado gold ore is low grade, thus requiring a large amount of handling and incidentally giving employment to a larger number of men than where high-grade ore is the rule. The slump in silver has turned the Centennial State's attention largely to gold-producing, and the Colorado miners hope by increased effort in that direction to find compensation for the depreciation in the sister metal.

The President's Message.

Congress met in regular session last Monday and the President's message was read. By reason of the financial stringency, the adverse silver legislation, the Hawaiian imbroglio and the impending tariff "reform," the message was looked forward to with more than usual interest. It is a dull document of 15,000 words, chiefly remarkable for what it does not say, and is universally commended, in England. What is good is not new, and what is new is not good.

Regarding the repeal of the silver-purchasing clause of the Sherman law President Cleveland says:

> The recent repeal of the provisions of the law requiring the purchase of silver bullion by the Government as a feature of our monetary scheme made an entire change in the complexion of our currency affairs. I do not doubt that the ultimate result of this action will be most salutary and far-reaching.
>
> In the nature of things, however, it is impossible to know at this time precisely what conditions will be brought about by the change, or what, if any, supplementary legislation may in the light of such conditions appear to be essential or expedient. Of course, after the recent financial perturbation, time is necessary for the re-establishment of business confidence. When, however, through this restored confidence, the money which has been frightened into hoarding places is returned to trade and enterprise, a survey of the situation will probably disclose a safe path leading to a permanently sound currency abundantly sufficient to meet every requirement of our increasing population and business.
>
> In the pursuit of this object we should resolutely turn away from all hurry and temporary expedients, determined to be content with nothing less than a lasting and comprehensive financial plan. In these circumstances I am convinced that a reasonable delay in dealing with this subject, instead of being injurious, will increase the probability of wise action.

A vague hope that "a survey of the situation will disclose a safe path" is not of much present practical avail. He says that the deficiency in the treasury will be about $28,000,000 at the close of the fiscal year, June 30, 1894. This is believed to be an error. There is already a deficiency of $30,000,000 during the five months of the current fiscal year, and men at the seat of government who have given careful study to the matter say that the deficiency will be somewhere between $50,000,000 and $60,000,000. Information, to be of value, must be accurate.

Regarding the tariff, he thinks, like Gen. Hancock, that the tariff "is a local issue," and, if local discrimination is insisted upon (which he hopes will not be the case), the new tariff bill will have a hard time of it.

On the Hawaiian question he vouchsafes no information to any one in or out of Congress, beyond the general statement that he knows what he is doing, and when it is done he will let Congress know.

He upholds civil service reform, makes a manly plea for economy in public expenditures and gives extended statistics, which are condensed from the reports of his secretaries and subordinates; and, while nothing positive or conclusive can be derived from a perusal of the message, which is in its entirety a disappointment, it is evident that the dominant idea the President desires to convey is that he favors tariff reform, and wants the present Congress to pass the Wilson tariff bill.

ONCE in a while some writer for the agricultural papers arouses to the greatness and multiplicity of the virtues of the mule and writes a paragraph on the subject. Then the matter drops and the excellences of the long-eared musician are forgotten or are remembered faintly by those who believe that the great worth of the hybrid is tempered by a yet greater crassedness pure and undefiled. Perhaps this is the reason that so few farmers have seen their profit in raising these long-eared embodiments of energy and melody. The popular notion seems to be that mules are of all created beings (except, perhaps, the mule's father) the most contrary, and have the nimblest and most untrustworthy of heels. But there are those who, knowing the mule well from long acquaintance, declare that no better beast of burden lives; that if properly treated and well trained in the earlier decades of their existence they are good-tempered, quiet and reasonably obedient; that to raise a mule requires less outlay of care and cash than will be required in raising a colt of like age; that when raised the mule will bring a better price than can be got for the average colt of the same size and age; and that the mule is tougher, will live far longer, do more work, and some time or other will die harder than will the best horse ever known.

PERSONAL investigation on the part of the members of the California Debris Commission discloses numerous novel plans regarding the impounding of the debris, plans, too, of a practical nature. The impounding dams need not necessarily be of stone; brush, logs, rubble are found to be satisfactory material. In one case the hydraulic system itself was used in constructing the required impounding dam. The nozzle was turned on a hill, and bowlders and cobblestones sent whirling to the exact site of the proposed dam, the work being so cleverly done as to meet all legal requirements and receive the sanction of the Commission.

Deep Mining at Nevada City.

The notable revival of mining operations in the Nevada City district has its origin in two distinct causes, viz., the recent heavy investment of capital in gold-mining enterprises, and a sudden and authentic acquisition of knowledge that the mines were not worked out, as had been supposed. The mines of the Nevada City district are not deep, in the sense that they are deep on the Comstock, or even in the Grass Valley district. Some years since, it had appeared to be established that when a depth of 1000 or 1200 feet, at the outside, was reached, either the ledge pinched out or barren rock was encountered, and operations could not be profitably carried on beyond that point. Practice accorded with this theory and seemed to be fully justified by experience. Thus we find that four important mines of the district—the Champion, the Providence, the Nevada City and the Mountaineer—all several years since reached a depth on the ledge averaging 1200 feet, and effort to sink farther was abandoned, or about to be abandoned. Operations had thereafter been confined to the upper workings, to tunnels, or have ceased altogether.

But a distinct change has now taken place in the method of operation. It was discovered in one or two instances that the ledge did not disappear, or that the quartz was not uniformly barren at low depths.

Old theories have been exploded and old practice reversed. Renewed activity has marked the conduct of these four mines. In three of the mines the shaft has been steadily sunk in the last year or two, and in the fourth—the Nevada City—it is understood preparations are being made for similar work. The surface works are now being enlarged and improved for that purpose.

Perhaps the most noteworthy convert to the theory of the practicability of deep mining in the Nevada district is the management of the Champion, on Deer creek, one mile west of the town. The company has just replaced its old hoisting plant with another entirely new and very powerful, sufficient to carry on operations at a depth of 5000 feet on the incline. The present shaft depth is about 1300 feet, and one eight-inch and one six-inch plunger pump are used. The fly-wheel has an inside diameter of 9 feet, face 14 inches. Seven strokes per minute, with a four-foot stroke, is the average speed. The shaft is double-compartment, with separate hoists for each compartment. Twenty-one hundred feet of round wire rope (⅞ inch) are on each drum. Longer ropes will be used when required. Three water-wheels are used, and their power will be increased almost indefinitely by enlarging the nozzles, plenty of water, under a 218-foot head, being available. The Champion ledge pitches to the east at an average incline of about 40 degrees.

The Champion is in pay ore at the 1300-foot level, said here to average about $14 per ton. The cost of mining is about $2 per ton. The amount of dead work is not great. The ore averages perhaps six per cent of sulphurets, running from $80 to $150 per ton, which are treated in the chlorination works at the mine. Three tons are treated daily. The mine supplies a mill of 30 stamps, which runs day and night. It is certainly safe to say that milling and other expenses are not over $3 per ton, making $5 in all. It would appear that deep mining at the Champion has been demonstrated to be a success.

The experience of the Providence mine may also be given as another illustration of the entire feasibility of deep mining in this district. The shaft is now down about 1500 feet on the ledge. The dip of the ledge is about 30°, making the vertical depth of the mine about the same as the Champion. The cost of mining and milling at the Providence is stated by Col. Davis, the superintendent, to be $4.20 per ton. The company has a 40-stamp mill, of which 30 are constantly dropping. They have their own chlorination works for treatment of sulphurets. The sulphurets carry about 15 ounces of silver to the ton, which is saved, and which pays the total expense of chlorination. The average value of ore in the Providence is not a matter of public knowledge, but that it is great enough to afford a handsome margin of profit to the owners is evident from the energy of their operations during the past year, the enlargement of their surface works and the increased work mapped out for the futnre.

The results obtained from deep mining in these instances have not only been highly satisfactory to the several companies, but they are instructive and full of encouragement to all the other considerable mines in the district. They have given an impetus to mining operations that is of the highest benefit to all. They have shown the way to others who have heretofore feared to venture deep into the bowels of the earth. The ore shoots at these depths are just as considerable, and the ore just as certain to be pay as in the upper levels. From the present outlook, it is not too much to expect that the depth on the incline in some of the Nevada City mines will eventually reach a point equal to the depth of the

Idaho in Grass Valley, which is something like 2100 feet, vertical—the deepest in California. The Champion is now sinking at the rate of 12 feet per week—600 feet per year—and will continue.

In Memoriam.

It is with feelings of personal regret that the MINING AND SCIENTIFIC PRESS chronicles the death of Mr. C. H. Aaron, which took place in this city last Monday, the 4th inst. While ascending the front steps of his home on Thanksgiving evening, he slipped and fell hackward, striking on the pavement and fracturing his skull. Surgical aid was powerless, and he lingered in a comatose condition till death ensued.

For twenty years Mr. Aaron's writings have appeared in these columns, and thousands of letters from all parts of the country attest the value attached to his articles. He was a specialist on mining themes, and his published works have attained a large sale in this and other countries. He was a quiet, unassuming man, versed in mining and metallurgy, a good friend, an untiring worker, and leaves behind him a rich legacy in the friendly remembrance of his associates and the record of an honest, useful and upright life.

He added largely to the permanent literature of metallurgy in this country.

Like all progressive men, Mr. Aaron was duly modest. In the preface to the latest edition of his work on assaying he says:

"In preparing this second edition I have not been deterred from making alterations, and, as I hope, improvements, hy any fears which may he produced by the tacit admission that the first was not all that it might have been. Of those who have taken that as their guide, I have yet to hear of one who has been led astray; nevertheless I candidly think that all such may now be the gainers by laying that aside and taking this:"

And now, when

His part in all the pomp that fills
Ths circuit of the emsrald hills
Is that his grave is grsen

It may be said that his death is a loss to science and his life and his works a monument of painstaking, conscientious energy, which shall endure till all remembrance of him who writes and him who rests from his lahors shall have melted like streaks of morning cloud into the illimitable azure of eternity.

Free Lumber.

The new tariff bill which it is proposed to pass during the present session of Congress puts lumber on the free list.

The present duty is $2.50 per thousand.

The lumbermen of California, Oregon and Washington, regardless of political opinions, are united in opposition to removing this protective duty.

It is figured by experts that $50,000,000 is invested in the lumber industry of this coast. In the three States mentioned there are 850 mills where lumber is manufactnred and 404 shingle mills, whose output in 1892 was 2,300,000,000 feet lumber and 2,200,000,000 shingles, representing an aggregate valne of $27,000,000. About 26,000 men are employed, to whom is annually paid wages aggregating $18,000,000.

The lumber business is the great industry of the two States to the north of us. Last year our two sister commonwealths sent 325,000,000 feet of lumher into this State, and shipped 150,000,000 feet of lumber and 1,100,000,000 shingles east of the Rockies.

British Colnmbia, which has a larger timher area than the three coast States, is the chief competitor in the lumber husiness. Chinese and Kanakas are largely employed, at low wages, and the removal of the dnty of $2.50 would give our British neighbors a good market at the expense of the 26,000 well-paid white men and their employers.

The chairman of the Washington State Democratic Committee, Mr. Henry Drum, has already bought a sawmill in British Columhia, and others are getting ready to do likewise.

ELSEWHERE is pnhlished the report of the California Dehris Commission to the Secretary of War, and hy him transmitted to Congress last Tuesday. In addition to the facts already published and a statement of circumstances already familiar to many of our readers, it officially presents statements of general interest, and is of importance to every one directly or indirectly concerned in the matter of mining in this State.

RAIN OR SHINE makes no difference in the progress of work at the Midwinter Fair site. It looks now as though the great exposition would he opened on time—January 1, 1894. Every exchange received at this office from all parts of the coast has plans and practical projects looking to a proper showing of the mineral wealth of the coast.

Report of the California Debris Commission.

The report of the California Dehris Commission was laid before Congress last Tuesday. It says:

In cases where mining properties are large and hydraulic process is to be operated on a large scale, it is indispensable that the project be represented by a full written description and by full drawings. These drawings will show the position and extent of the storage reservoirs and means proposed for restraioing detritus, anó generally all that is necessary for full record of the case. The greater number of applications, however, will come from the owners of small properties where two or three men are to operate the system, or where miners are not in a position to furnish a full description, either from want of knowledge or from want of means to hire suitable engineering advisors. These are cases where the output is small. In such cases the Commission expects to use its discretion as to the form and fullness of the applications. The inspection of all mines, however, is to be maintained.

As required by law the Commission, generally by a committee of its members, has in every case visited the locality of the application. Some of these journeys require five or six days of arduous travel in the mountains.

The number of applications for permission to mine has not been great. The system is a novelty and its workings are yet to be understood. The miner is in the hands of the Commission. He is uncertain whether his practical device for impounding will be understood, uncertain whether or not, even if all goes well with the Commission, he may be involved in litigation.

It is probable that the increased expenditures and restrictions upon the freedom of operations involved by the new system of regulations may act to make mining in many cases less profitable than formerly, thereby reducing the magnitude of the output and the number of applications.

Everywhere in mining territory where auriferous deposits were found of sufficient extent and so situated as to be accessible to the water supply, and at sufficient elevation above the rivers to give a fall to the sluices equal to carry off the detritus, monitors were put at work washing down hills and transferring them to the beds of adjacent streams down which they were moved by freshets to the plains and water courses of the valleys.

Public and private injuries then created in increasing degree gradually developed opposition among the valley people and gave rise to litigation which eventuated in the injunction of the Circuit Court in 1884, forbidding certain mines to use the beds of rivers and streams as a dumping ground for mining debris. This injunction remains in force.

In the course of this controversy, which lasted over a number of years, there grew up in Sacramento valley an organization entitled the Anti-Debris Association. This association has its attorneys and inspectors. The United States also appeared in its own course and asked for an injunction against parties charged with depositing mining debris, not only in the beds of navigable waters, but resulting to alleged injuries to navigation.

Two cases have been decided. These cases touch closely the operations of this Commission as defined by the act of March. The reasons assigned for refusing an injunction in the North Bloomfield Company and granting it in the other case, mark an important distinction between detritus impounded in the beds of streams subject to a freshet and tributary to navigable waters, and a storage reservoir site not traversed by natural courses.

Mining operations have disclosed the fact that deposits of auriferous gravel are in the beds of distant rivers lying on the western flanks of the Sierra Nevadas one or two thousand feet higher than the adjacent modern rivers. It is assumed that the existing rivers have cut through channels since the period during which ancient rivers became first filled and were then obliterated by an overflow of irruptive matter.

The excavation of these channels in past years by the hydraulic process has left large cavities now available for refilling with new detritus. These pits are admirable reservoir sites. No natural water course traverses them and the natural drainage is of little extent. To refill them is to restore them to a state of nature. If barriers to restrain are necessary they are only so during the process and operation of mining.

The barriers may afterwards decay, but the detritus remains impounded. This circumstance was recognized by the court in its refusal to enjoin the North Bloomfield Company and this the key to the situation.

Aside from these reservoir sites and other such natural sites as may fulfill equivalent conditions of safe storage, there remain for deposit the beds of natural water-courses. The storage here is not so favorable.

The gold-mining industry is important in its bearings upon the general interest of the United States as well as upon local prosperity, and the risk is so great that ill-advised restriction upon activities is to be carefully avoided.

On the other hand the great amount of material that has been handled and stored by hydraulic process to getalittle gold makes the problem of securing impoundment and of the protection of navigable waters and adjacent lands one of equal seriousness. Old tailings have been reworked without restrictions by the courts or opposition of the people of the valleys. This work does not come within the definition of hydraulic mining.

From the day of its organization the attention of the Commission has been fully occupied with matters relating to the resumption of hydraulic mining and to the individual duties of its members. During the coming session it is proposed to make such surveys and examinations as may appear necessary to fulfill the requirements of the law.

The balance on hand from the appropriation of March last of $15,000 for the expenses of the Commission is $13,828.44. It is estimated that the additional amount of $20,000 will be required to make the surveys and investigations required.

The restraining barrier at or near Deguerre Point on the Yuba river is considered an advisable construction to be soon undertaken for restraining all detritus now in the beds of streams in furtherance of the project for improving the Sacramento and Feather rivers. A suitable appropriation for this work will be $300,000.

The Commission is by act of Congress left very much at its own discretion, and is compelled to rely mainly upon its own judgments, being unprovided with a legal adviser, and is of necessity compelled to its own conclusions in deciding certain legal points.

A party presented an application in which he stated that he was the owner of mining property which he desired to mine. The attorney of the Anti-Debris Association controverted that the applicant was not the owner and offered to present proof that the property had been sold to another party by the United States Marshal and this party held the deed. The attorney urged that the Commission is required by act to take notice of this fact and refuse a permit for the reason that the law confers a permit to proprietors. On the other hand, the applicant was in possession of the property, and claimed to hold it by deed from the sheriff of Nevada county, who had sold the property to meet unpaid taxes. In view of all the conditions, the Commission decided upon a rule of action to the effect that the party in possession is, until the course of law shall have determined otherwise, considered and recognized as the owner.

AS TO THE SLUICING OF TAILINGS.

The report deals at length with the important question of sluicing tailings into the streams, and takes the stand that such sluicing does not come under the head of "hydraulic mining," as authoritatively defined. It will he remembered that in the famous legislative contest the following was the definition announced:

Hydraulic mining * * * is mining by means of the application of water under pressure through a nozzle against a natural bank.

On this important point the language of the Commissioners' report settles definitely the satisfactory latitude allowed to miners in the reworking of detritus. The report says:

The definition of hydraulic mining is mioing by water under pressure directed against a natural baok. It has also been mentioned that throughout the period of cootroversy old tailings have been reworked without restriction by the courts or opposition of the people of the valleys. This work does not come within the definition of hydraulic mining. No nozzle is used and the water is not used under pressure.

The tailings are shoveled into sluices and the gold is separated through the shifting agency of running water by the aid of riffles and amalgamation with quicksilver. The effect is to remove material from one place to a lower position.

The work has hitherto been confined to the beds of streams filled with tailings. The operation does what the freshets do—that is, it moves material down stream. There is no great objection to this process confined to beds of streams. Doubtless it disturbs and transports some finer matter which might never have been otherwise displaced, but this is of no great importance.

The case is somewhat different when applied to deposits impounded in beds of streams or elsewhere. It is quite practicable and, so far as is known, permissible under the law to work, by sluices, tailings which have been kept out of river beds by barrier or otherwise, and to deliver them reworked to the beds of streams in positions from which damage to navigable waters may result.

As the law stands, so far as the act of March 1, 1893 (the Caminetti act), is concerned, while the hydraulic miner is required to deposit his tailings securely, the sluice miner may perhaps in a legal manner remove the tailings from the reservoir without any obligation to restrain them in their new positions. Perhaps the scale of this work may be so small as to be unworthy of notice and perhaps if it should become important the courts would intervene by injunction.

Regarding the probable extent of hydraulic mining under the provisions of the Osminetti act, the commission says:

The commission has no means as yet of estimating the number of applications with which it will have to deal. In 1880 more than 400 hydraulic mines were reported to be in operation within the drainage area of the Sacramento and San Joaquin rivers.

The assessors of the mioing counties reported in 1880 over 10,000,000 inches of water used in mining. The State Engineer's estimate of the quantity of gravel mined in that year exceeded 38,000,000 cubic yards. The amount of workable gravel yet remaining is indeterminate. Competent authorities place it at several hundred million cubic yards.

It is not supposed that the commission will have to deal with all, or nearly all, of this great mass. But on the other hand it is not possible yet to estimate the percentages to come under our control. Much depends upon the working of the system of control during the coming year.

It is probable that increased expenditures and the restrictions upon freedom of operations involved by the new system of regulation may act to make mining in many cases less profitable than formerly, thereby reducing the magnitude of the output and the number of applications.

Cavities created in gravel beds in the high Sierras and their present availability for reservoir sites is a subject treated upon in the report. We quote:

It is true that these sites are not profitably available for storage in quantities at all approaching the contents as they were in a state of nature. Some of them may not be at all practicable sites for any great amount of storage. This is due to the fact that often there is not fall enough from the gravel to be mined to the level of the reservoir site. A fall of at least 100 feet to the mile is generally necessary, to enable the sluices to carry the detritus. Much more fall than this is used when available. The fall diminishes as the reservoir becomes filled. The limit of profitable mining may be reached before the best ground in the mine, that which is lowest is broken.

Under such circumstances the miner has a resource in elevating the gravel. This is done by using a large portion of water-power to raise the material to a higher level. It is practiced to some extent. It lessens very much the quantity that can be worked in a given time by a given water-power. Nevertheless, it has been used to lift to heights as great as 80 feet.

A second point worthy of attention in the decision of the North Bloomfield case relates to the condition of escaping water wasted after it has performed its full mining duty. The Court practically holds that if the sand and gravel be restrained it is not to be insisted that the residual water shall be clear, the evidence proving that the finely divided clay, which gives color to the water, is nowhere deposited in appreciable quantity.

Apart from these reservoir sites, and from such natural sites as may fulfill equivalent conditions of safe storage, there remain for deposits the beds of natural watercourses. Storage here is not so favorable. These streams are subject to freshets. They have falls of many feet to the mile. In some cases the streams in freshet may be termed torrents. Two cases may be distinguished: First, where the barriers are overtopped; and, second, where a separate channel is made.

PROBLEMS OF THE FUTURE.

Overfall barriers are subject to danger of destruction of violence of flood, and, if built in wood, sure to decay in a few years, so that sooner or later there comes a time when they no longer retain material deposited behind them.

Independently of these considerations, the equilibrium of a river bed of movable materials, over which unequal flowage occurs, a rivulet at one season and a torrent at another, cannot be regarded as constant under these different circumstances. There is probably no constant slope of equilibrium. It varies with the flowage.

While, therefore, a barrier placed across the bed of such a stream must restrain, it can hardly be said to restrain all, and perhaps not nearly all, deposits. The wider the bed the smaller the freshets, and the thinner the height of overfall the more effectually will the barrier restrain.

A modification, which passes the flowage in a separate channel and permits no overflow at the barrier, relieves the structure from the more imminent perils. Yet the watercourse passes over and through the reservoir, and while the barrier so long as not overtopped may be safe, yet uncertainty exists as to the efficacy of storage after a time, due to causes already mentioned. Moreover, mining ceases in time. The residuum remains. In what way is natural decay or particular damage to a restraining system to be repaired? If the stream have little or no natural drainage, the case is simpler. The gold-mining industry is important in its bearings upon the general interest of the United States, as well as upon local prosperity, and the risk is so great that ill-advised restriction upon activities is to be avoided. On the other hand, the great amount of material that has been handled and stored by hydraulic process to get a little gold makes the problem of securing impoundment and of the protection of navigable waters and adjacent lands of equal difficulty and seriousness.

Between these opposing and delicate conditions the Commission has to risk its way.

NEW MINING COMPANY.—Dr. W. C. Jones, Frank Dulmaine, D. B. Marwick, Adolph Dulmaine and Jas. P. Shoemaker are the directors of the Shoemaker Gold Mining Co., the new mining company organized near Grass Valley.

Advertise Your Mines.

TO THE EDITOR:—Mr. W. S. Chapman has an article in the PRESS of this week on the "Profits of Gold Mining," which is interesting enough, but not entirely convincing to those unfamiliar with his premises. Gold mining is profitable, of course, when you have a big ledge, a good grade of ore and plenty of money to avail yourself of your advantages. There is no disputing this conclusion; but I would like to know how often you find a mine with all the necessary conditions. We have heard a great deal from Mr. Chapman and others of late about the thousands of millions locked up in the Sierras, and the indifference of local capital in regard thereto. All I can say is, these thousands of millions are very coy toward the "caviare" and demonstrative in unfolding their charms only to a chosen few. The writer of these lines has been running all over the State for the past two years in search of a mine, and has not yet found one. Since January of the present year he alone has examined and experted 24 different properties and found only one of them suitable, and this he did not succeed in securing.

Fearing that Mr. Chapman may think I did not properly choose my territory, I will inform him that among the things looked into were two extensions—one north and one south—of the Taylor. They were both well opened with ledges from 20 to 100 feet in width and reputed to run from $4 to $10 per ton, but after most careful testing they actually went only from 50 to 75 cents. I am not alone in my general experience. I have a friend, a quiet gentleman from the East, who, in the past few years, has sunk $150,000 in the mines of this State without receiving any returns. He has also spent the better part of the present year in trying to find something, and, not succeeding, he is about to return to his Eastern home in disgust. There are at least half a dozen heavy men in this city who would take a good mine, but they will all tell you that they have spent years of time and barrels of money in hunting for such a thing to no purpose.

Mr. Johns, of the Sierra Buttes, has to my positive knowledge looked at scores of offerings in the last five years, and, after the most thorough sifting and winnowing, the very best thing that he got was a mine that does not produce above $10,000 a month gross with 30 stamps, or at the rate of $4 to $6 a ton; and this is regarded as so extraordinary it is one of the things thrown into your teeth when you venture to express a doubt as to the Golcondian quality of our mines.

Water will wear away a stone at last, and Mr. Johns, persistent and indefatigable as he is, has had so many disappointments, has been sent on so many fool's errands in recent times—going to look at things which were never as represented—that he has been compelled to post a notice in his office as follows: "No Mines Entertained Here." Examples of this sort could be multiplied *ad infinitum*, but enough has been said, perhaps, to prove that valuable mines are not so numerous nor capitalists to take them up so few as enthusiasts suppose. Mr. Phil Armour was no doubt impressed with this fact when, recently wanting $500,000 at a pinch, he applied for it in Europe where it could be obtained, instead of consuming half a lifetime in hunting for a mine like the Kennedy to give it to him. I am perfectly familiar with the Kennedy, and with every mine of prominence in the State, by personal inspection or otherwise, and, notwithstanding, all I can say is: If a man wants a pound of butter in a hurry, he will be wise to go to the corner grocery for it, instead of talking about waiting until the cow be milked and turning it out of a churn.

It is possible there may be some good mines in the State, but the trouble is for capitalists to discover where they are. These brokers in San Francisco who have charge of presenting properties are, as a class, utterly unreliable. How could it be otherwise? They receive notes and accounts of mines always at second-hand; they have never seen what they offer; they are mostly penniless and thereby incapable of verifying reports. It is marvelous what these people will often tell you. Not long since, I was sent by one of them to look at a mine with a ledge 15 feet wide, 500 tons on the dump going $18, with a series of other ledges, running from 4 to 8 feet, thrown in. I found the main ledge to be three feet wide, about 40 tons on the dump, instead of 500, the subsidiary ledges running from a streak to a few inches, and nothing assaying above $1 a ton. This case is typical of a hundred, and it must be allowed that unless the business of selling mines passes out of the hands of customers like these the industry is likely never to progress.

There is a way out of the difficulty if mine-owners would only adopt it, and that is to advertise their mines in some reliable paper—the MINING AND SCIENTIFIC PRESS for instance. This should not be done in isolated cases, but the owners of good properties everywhere should combine and engage one, two or three columns of the paper by the year, so that the expense would not be heavy on any one individual in particular. In this manner mines would be brought immediately to the attention of capitalists, and a way opened up for negotiation with the owners direct without the intermeddling of go-betweens and brokers.

For years I have not known of any mine which has been sold through the agency of these parties, and therefore the method I suggest would not in any event be likely to prove more disappointing than that now in vogue.

San Francisco, Nov. 25, 1893. "INVESTOR."

A Matter of Mutual Interest.

TO THE EDITOR:—Just a word for the mining exhibit of the Midwinter Fair. All miners should join in heartily with the circular sent out by the Mining Committee, and it seems to me all miners—actual miners—should contribute something to aid this exhibit. Some say, "Let the mine owners do it," that they make all the money, etc. I claim that the miner who works every day and gets his $2.50 to $3 and more, is directly interested, and more so than a mine owner, in the success of this grand display, where an opportunity is given to show up the wealth of our Golden State and make a fitting illustration of its golden resources, or what would be better, its mineral possessions. Let all miners give something; if not one day's pay, give what they can. It is not money thrown away. The managers are all good men and true and will see to it that all moneys are properly expended.

We never have had such an opportunity to "display our goods" in the history of California. Now let us embrace it. Let no jealousies mar the proceedings in any manner. Bring or send your gold, silver, copper, iron, tin, coal and all the rest of the articles that will come under mining, from San Diego to Del Norte and from the Golden Gate to Tahoe lake, and when we go to see it we may all say, as we point with pride to our mining exhibit, "I helped it all I could." Yours for success, J. R. TREGLOAN.

Amador City, Nov. 30, 1893.

From Ventura County.

TO THE EDITOR:—The Bunker Hill quartz vein is 30 feet wide, although gold is found for over 100 feet in width, but the true vein is less than that. The Frazier mine is working four or five men. Mr. Chilson is superintendent, and he has made a big strike in the mine several feet deeper than the mine has hitherto been prospected. The ore is rich and there is a big body of it. As the Frazier mine has been prospected deeper than any other mine in the district (over 300 feet), it is encouraging for others to go down on their claims.

Prospecting for placers is the go here, now. There is no boom and we do not want any, and this is no place for poor men to get work. E. H. Meyers from Ventura is here collecting specimens for the Midwinter Fair, and he has discovered a fine quartz lode which prospects well. I. H.

Piru Mining District.

The Colorado Silver League.

Geo. C. Merrick, in his call as president of the Colorado Silver League for the meeting at Denver on the 7th inst., says:

"The silver question has become a national question, to be carried into the elections of 1894 and 1896, and the work of education should be extended so as to reach every voter, especially in the great manufacturing States of the South and East. To do this, organization is essential. The situation now calls for such action by the State League as will unite and consolidate the sentiment in this State and sound the note for the campaign of 1894 and 1896.

"At this meeting of the league, officers for the ensuing year are to be elected, therefore it is important that every silver club in the State shall be represented, as this will be the most important meeting ever held in the State upon the silver question.

"No backward steps! No surrender! No faltering! No compromise! Until the money of the constitution—silver and gold, 16 to 1—is restored to the people, and the sovereign power exercised, under constitutional limitations, as provided by the fathers of the republic."

Some Large Figures.

The Director of the Mint in his annual report says the value of the gold deposited during the year was $50,000,000. Silver deposits amounted to 73,000,000 ounces. The export of gold was $108,000,000; imports of silver, 42,000,000 ounces. The amount of silver offered for sale to the Government was 98,487,890 ounces; amount purchased, 54,000,000 ounces; average price paid, .843.

The total amount of silver purchased under the Sherman act up to November 1st was 168,674,682 ounces; average price, .9224; coining value, $218,048,431. Silver bullion on hand November 15th, 130,494,825 ounces; total amount purchased since April, 1873, 496,984,894 ounces, costing $508,933,975.

The stock of gold in the United States July 1, 1893, was $597,000,000; silver, $615,000,000. The gold coinage throughout the world during 1892 was $168,000,000; silver, $143,000,000.

C. H. Aaron's Death.

Elsewhere editorial reference is made to the sad death of Mr. C. H. Aaron, so long and honorably connected with this paper—a man who stood high in the science of mining and metallurgy.

The following, which will be read with interest by those who knew him and knew of him, is from the S. F. *Examiner* of the 6th inst.:

From the remote effects of a blow from the sandbag of a highway robber, the last of the three miners and metallurgists of this State who have written standard works upon the subjects of which they have made special study died on Monday. On the evening of the 4th of November, Charles H. Aaron, a man known to all the miners of this coast, was attacked by a robber and beaten with a sandbag. Before that time he had noticed indications of incipient locomotor ataxia. The blow on the head seemed to excite this disease and his ill health made him despondent. On Thanksgiving Day, Mr. Aaron fell down a flight of eight steps, and, striking his head on the stone pavement, fractured the skull. From this injury he died at the German Hospital on Monday afternoon.

Mr. Aaron was born in Birmingham, England. When a young man he made a couple of voyages to sea and then came out to California, where he arrived in 1852. He was one of those to form the famous Walker filibustering expedition in 1853, but soon became disgusted with the party and its purpose.

Then he went to mining. While in Montana about 1864 or 1865 he wrote to his brother in Marysville for funds to help him continue his prospecting. His brother, who was an assayer, wrote that it would be best for him to come to Marysville and learn the assaying business. This he did, and it was his first start in a business that he made a success of. He studied chemical metallurgy, and particularly gave his attention to silver ores.

He was always interested in the "wet processes," and wrote largely on chlorination and lixiviation. Of late he has given much attention to the cyanide or MacArthur-Forrest process for the working of gold ores. Mr. Aaron had large experience as an expert millman, in which his intimate knowledge of chemistry greatly aided him. In the pursuit of his profession he has been in Guatemala, Honduras and other parts of Central America. His last work was in Honduras, from which place he came back in poor health.

Mr. Aaron has written several books on assaying and metallurgy, all of them of a popular character. That on "Testing and Working Ores" was intended for miners who had no chemical knowledge. His writings were all plain and simple, and he possessed the faculty of stating his point so it could always be clearly understood.

In addition to his books he has been a frequent contributor to the MINING AND SCIENTIFIC PRESS of this city and the *Engineering and Mining Journal* of New York. An article by him on the milling of gold ores, based on his observation and experience in California, and published in the latter paper August 10, 1889, was republished in the Reports of the last census as an epitome of that subject. Most of Mr. Aaron's writings have been on chemical metallurgy, but he wrote frequently on miscellaneous subjects, and possessed a sense of humor which always made his writings agreeable even with a "dry subject." He has written and published more books and articles than any other metallurgist on this coast. He was considered an authority on the milling of gold and silver ores. Mr. Aaron never had much education in schools, but was always a student, and when he hunted for a thing was very apt to find it.

Among his publications in book form were "Assaying" and "Aaron's Leaching Gold and Silver Ores."

Kustel, Phillips and Aaron were the three Californians who wrote of these subjects and Aaron is the last to die.

THE sea serpent has been seen again, this time, according to yesterday's dispatches, by F. O. Peters, of the steamship American, in north latitude 43° 55′, west longitude 56°. The sea serpent story is a little late this year. It was due the week before Thanksgiving. All these yarns are behind time this year. The woman who found coarse grain gold in the crop of the chicken she was dressing for dinner has not been heard from yet, though the occurrence should have been wired by October 30th. The 86-year-old man who chops half a cord of wood before breakfast and cracks hard-shelled nuts with his teeth lags on the way. The woman who danced pirouettes and flourishes all the evening at a family party and then went home and bad twins, and the old lady who, though not wearing spectacles, has just completed a quilt with 81,647 pieces in it, are away behind schedule time. Usually these stories appear annually between September 1 and December 1, and their tardiness this year is another instance of the far-reaching financial sluggishness.

THE State Board of Fish Commissioners has issued a handy pocket-size pamphlet of 140 pages, containing the fish and game laws of California as prepared by the attorney for the board, F. P. Deering. It contains the general law on the subject and all ordinances adopted by county Boards of Supervisors. It should be in the hands of all who have interest in the game resources of the State. As it is a public document, we presume a copy can be had free on application to the secretary of the board, W. C. Murdock, 33 Chronicle Building, San Francisco.

THE secretary of the Montana Mining Co. states that the total output for October was: Gold, 1580 ozs.; silver, 14,960 ozs.; and that the estimated realizable value of the same was $41,100. The tonnage of ore milled during the month was 5568 tons, 90 stamps having been in operation. The expenditure was as follows: Working expenses on revenue account, $33,600; outlay on shafts and developments, $6200; extraneous expenses (including insurance for month), $1566; legal expenses, $500; expenses on capital account (on tailing dams, etc.), $100—$8366; total, $41,966.

An Interesting Discussion.

TO THE EDITOR:—Referring to your extract from *Popular Science Monthly* appearing in MINING AND SCIENTIFIC PRESS of Nov. 11th, containing an alleged assertion of Laplace that he could improve on the present system of celestial illumination by a simple change in the moon's distance and velocity, perhaps a few further remarks would not be without interest. I should premise that I can scarcely credit the statement that so distinguished a scientist as Laplace could make so absurd a blunder, and should feel thankful for a precise reference, by page and paragraph, to the work of his in which the quoted words occur. Permit me to add that, as there are doubtless many mathematicians, physicists and astronomers on the coast and elsewhere who are readers of your paper, I invite their criticism of the following necessarily brief discussion:

In the first place, as light varies inversely as the square of the distance, and, as the moon is now at only about 1-400 of the sun's distance, the removal to 1-100, by which Laplace proposes to improve its illuminating powers, would involve, from increase of distance alone, a diminution of its light in the ratio of 16 to 1.

In the second place, Laplace asserts that the moon, in that position, could not be eclipsed, when the fact is that orb, in the position designated, would be in a state of perpetual partial eclipse. It would certainly be beyond the apex of the cone of the earth's darkest shadows, the region of full eclipse; but the earth at that distance would still intercept from the moon the direct rays from nearly half the sun's surface, which could only reach it by being refracted in passing through the earth's atmosphere. Just how far these refracted rays would help the illumination may be judged from the fact that they reach the moon in the same manner, under present circumstances, when totally eclipsed, with merely the effect of rendering her disc visible.

It would thus appear that, according to laws of light, some 25 or 30 of Laplace's moons would be required to give as much light as our solitary moon does at the full—rather a waste of material in face of the fact that, with a second moon placed in opposition to the present to revolve in the same orbit, we could have an equal quantity of light all the year round.

It is not for me to enter on questions, of which I at least am ignorant, as to how much of that transformed light the human race could enjoy without injury; but that it has a powerful physical effect on the optic nerve, for instance, is generally believed. The considerations also relating to tides, the attraction which now causes them being, in the proposed system, diminished in a still greater ratio than light, I will pass by; nor is it worth while to more than comment on the disingenuous suggestion that believers in design must admit the moon's failure because it does not give equal light or more light or less light, as no intelligent person doubts that the moon gives all the light it was ever designed to give, while he can reasonably contend that whoever put the moon in place, and subjected it to laws, resulting in stable orbit amid perpetual motion under the most complicated circumstances, could and did give us all the light and all the darkness he thought proper.

Waiving further notice of these issues, I beg to proceed to a brief discussion of the mathematical plans of the question:

1. Is the moon's permanence in the assumed orbit a physical possibility?

2. Possibility being admitted, is Laplace competent to calculate the exact conditions which will ensure equilibrium?

There is a problem of extreme difficulty, well known to mathematicians, called the "Problem of the Three Bodies," which requires the curves three bodies will describe through their interaction under the laws of gravitation. The general solution of this problem has never been accomplished, while that under discussion involves far more complicated combinations. A simple statement of the facts will show that Laplace was not competent to give the data necessary to calculate the conditions which should ensure the permanence of such a system.

Let us suppose there were only the three bodies—the sun, earth and moon—in the universe; in that case, any intelligent schoolboy with a knowledge of the laws of gravitation might readily calculate the position and velocity required for equilibrium in the proposed orbit; and, in their solitary universe, the three would maintain their respective positions for all time. The position of the moon, however, would be one of unstable equilibrium, similar to a globe balanced with its surface on a needle's point, so that, in case of unbalanced disturbance, its effect instead of being rectified will be aggravated and hopelessly perpetuated in ever-increasing ratio by the central forces. Let us suppose an infinitesimal disturbance, caused by the moon's gravitation to the earth, being diminished the amount due to the difference of the attraction, on each, of one of the planets. The moon at once increases her distance; this reacts on the gravitation, still further decreasing it. The moon's angular velocity is also lessened, so that she begins to drop behind the earth; the sun and earth no longer pull together, but at an angle by which still more force is lost. These reactions go on increasing until the moon's proposed orbit is completely changed, and she parts company with the earth forever. This, of course, is on the supposition that a second disturbance or, rather, a cycle of disturbance—for they never cease—did not occur just at the right time, of the exact force necessary to restore equilibrium or throw the moon just so much too far, as might be needed for other cycles of changing attraction to all eternity.

To balance the effects of these constantly varying disturbances, absolutely necessary as it is, owing to the inherent unstability of the system, to ensure permanence, is entirely beyond the reach of human knowledge and human calculation. The changes are constantly varying according, in each case, to a multitude of interacting laws which make the minutest portion an object of the utmost complexity; and the full solution of the problem should make that of "the three bodies" appear a mere boy's exercise, yet the latter remains unsolved.

When, therefore, to the sources of disturbance already specified, we add the unknown amount produced by impact of meteors, etc., it is plain that human calculation cannot reach the problem, while it may very well be that permanence is wholly incompatible with the system.

It may be urged that the same difficulties beset any system, so that a more direct comparison of systems may be satisfactory.

With a single center, as at present, a wide range of disturbance is balanced by means of the inherent properties of the system—a decrease of distance, for instance, by an increase of velocity and centrifugal force, while a deviation toward the center in tangential direction causes an amount of diminution in distance which bears but a small ratio to the entire distance from the center, where the source of attraction is situated. In Laplace's system any decrease of distance is, in its effects on attractive force, equivalent to a decrease of about four times the amount with a single center, while there is no corresponding increase of velocity possible; and a deviation toward the center, in tangential direction, bears in its results a ratio to the distance between the moon and one center of attraction 100 times as great as it would if the whole source of attraction were at the geometrical center, so that a disturbance which would cause no serious change in the latter case, would in the former oblige the moon to pass through the earth's orbit within the 44th part of a revolution, a deviation of a little above 8° being tangent to that orbit. It does not, therefore, seem to be a desirable, even if it were a possible or an otherwise advantageous system. The comparison of Laplace with Newton, instituted by the writer of the article referred to, seems, from its tone, to imply that Laplace is at least as good an authority on such subjects as Newton. But mathematicians take nothing in their science on authority; they want the figures and the discussion. If Laplace could have solved, as he pretended, the problem referred to, the still unsolved "Problem of the Three Bodies" should have presented no difficulty. Newton, by his system of Fluxions, and, by a strange coincidence, independently of him, and simultaneously, Leibnitz, by his system of Calculus, revolutionized mathematical science and laid the foundation for modern mechanical progress. If their intellectual equals have since appeared on earth they certainly have given no adequate proof of it; and to liken Laplace to Newton, on the evidence, is like equalizing a good engine runner with Watt or Stephenson. The equality, in each case, may be a metaphysical possibility; but there is no better proof of it than I have yet seen for the permanence of the orbit of Laplace's obnubilated moon. D. S.

Austin, Nev., Nov. 28, 1893.

Oregon's Mining Exhibit.

Commissioner Ayers writes as follows in regard to the result of Oregon's mineral exhibit at Chicago:

A mining man was more at home among the piles of ore in the Oregon exhibit than among the mahogany and glass-covered showcases of the others, where he could only look at the beautiful specimens, but was not at liberty to examine them. Ours were there for inspection and examination, while the superintendents were on hand to explain their different characteristics and composition, together with a description of the mine from whence they were taken. In fact, we were here to try to induce people to come to Oregon and not to show to great hordes of sight-seers something to please their eye for the moment, only to be forgotten before they were ten steps away. Our simple and inexpensive methods will bring just as great returns. All our fixtures were made in Oregon, of Oregon material and by Oregon mechanics, so that all the benefits possible to be derived from the expenditure was enjoyed at home.

A number of our mines represented have received awards. Oregon stands at the head with her great nickel mine at Riddle, it having received the high award and medal over even the great New Caledonia nickel mine, as producing the finest grade of silicate of nickel. This fact alone is worth to Oregon all the entire cost of the exhibit. Small pieces of the ore were anxiously sought by the visitors as mementoes. Our Oregon marble also received special recognition and an award. The little placer mine has proved itself a drawing card, as well as an instructive lesson to many. It was crowded from morning till night by people anxious to see how gold is washed from the dirt. It also got away with a gold medal.

And so it goes. What would have been the result had we only had six months instead of six weeks in which to make up an exhibit, and the pleasant, agreeable weather of summer to do it in instead of the cold and stormy winter? This was the one great opportunity of a lifetime, and now that it is over how easily is all this to be seen. The amount of money spent by the commission in making our display in all the different departments will return to the State tenfold.

The familiar faces of numerous Oregonians were to be seen daily, and the registers of each of the departments are well filled with their names. On my register there are 1395 names of Oregonians that have called, singly and in numbers, from the opening of the fair until the close. In the horticultural department there are still more. Oregon is "in it." C. W. AYERS,

Mining Commissioner for Oregon.

A New Hot Blast Copper Furnace.

An improvement recently placed on the water-jacket furnaces of the Old Dominion Copper Co., at Globe, Arizona, consists of an arrangement for heating the blast before it enters the furnace, and as it has been so eminently successful in its work, a correspondent of the *Silver Belt* describes it in detail, first giving the construction and afterward showing what effect it has had on the working of the furnaces, and in what ways it has effected a saving of time and a reduction of the running expenses.

The improvement is of the simplest kind, consisting of a wind-jacket completely surrounding the crucible of the furnace, and being in connection with the blast supply pipe and also with the regular wind-box. In operation the blast coming from the supply pipe enters the wind-jacket in the usual cool condition, slightly higher than the surrounding atmosphere, and passes completely around the crucible, here coming in contact throughout its passage with the hottest portion of the furnace. After making the circuit of the crucible it flows into the regular wind-box, and thence to the tuyeres in the regular fashion. In making this passage it serves several purposes:

1st. It heats the blast to a high degree by taking up the heat which has formerly been lost to such a large extent by radiation, now taking it back into the furnace to perform useful work by reducing the coke consumption.

2d. It keeps the crucible from getting abnormally hot, thereby saving wear and tear caused by great variations of temperature, and saving the time which was formerly lost in cooling it down when it got in this highly heated condition.

3d. Making it very much cooler and more comfortable for those working in the vicinity of the furnace.

When one of these new wind-jackets was first placed in operation by this company they ran a comparative test of this furnace and one which was exactly similar except that it had not the wind-jacket, both being 42-inch furnaces of the ordinary type. The test was very successful and showed that the jacket effected a saving of five pounds of coke in every charge of 600 pounds of ore. In this furnace the temperature of the blast is raised 55°, as has been determined by many readings taken just before entering and leaving the jacket.

A jacket was shortly afterward placed around the crucible of a second furnace, and by slightly modifying the design it has been made even more successful than the first one, as the temperature of the blast in this case is raised 83.5° in its passage, and the furnace is now running on one pound less coke per charge than the first one, or six pounds less with the jacket than without. As stated above, there is increased economy by saving the time which was formerly lost by having to cool down the crucible when it became abnormally hot, thereby allowing more ore to be smelted at the same cost for labor and fixed charges.

The Old Dominion Copper Co. are now using two of these jackets, one of which has been in use for two months, and they are now putting one on their third furnace, so well are they pleased with it.

The wind-jacket is the invention of Mr. Louis B. Walker and Mr. John Murphy, who have applied for letters patent on it, and hope to get it established in some of the other smelting plants of Arizona, as they consider that the high price of coke in the Territory will demand its adoption.

Southern Plumas and Northern Sierra.

[Abridged from the Plumas *National-Bulletin*.]

Gibsonville, one of the historic mining towns of California, is hut a short distance beyond the southern boundary of Plumas.

The Taber Mine is but a short distance below Gibsonville. Nearly 25 years ago Horace Taber began driving a tunnel into the Gibsonville ridge for the purpose of tapping an ancient gravel channel, breaks from which he thought supplied much of the gold in the vicinity of Gibsonville. During all these years, as circumstances would permit, he labored to accomplish the result aimed at. It has cost him about $50,000 up to the present time. The tunnel is now in 2640 feet. The first 150 feet is timbered, 1300 feet through a lava cap, next 130 feet through pipe-clay, then 500 feet through bedrock, and the remainder of the distance through hard blasting rock. Mr. Taber expects to reach gravel within 50 feet beyond the present face of the tunnel, which is 600 feet below the surface. He owns a mile of the channel lying immediately above the property being successfully worked by the Thistle Shaft Company; also 500 feet of ground along the bed of the ravine below the mouth of this tunnel. That Mr. Taber's fondest hopes will soon be realized, if he continues to push his tunnel ahead, seems not to admit of a doubt.

Just below his property the Thistle shaft people are extracting rich gravel from a large channel. The gravel is hoisted over 500 feet through a shaft, stored and washed. Of necessity this method of working the mine is expensive, yet of such richness is the gravel extracted from the great channel that it pays well. This operation demonstrates beyond any doubt that for miles under the Gibsonville ridge exists an ancient auriferous channel, the development of which by the proper use of capital will cause an era of prosperity in that section important alike to Plumas and Sierra counties. Of the Thistle shaft enterprise, C. B. Wingate, a young man of ability, energy and enterprise, is superintendent, and Aug. Holtz is the foreman. At present, owing to a scarcity of water for gravel-washing purposes, only about 40 men are employed. Later on, probably 75 to 150 men will he kept busy in and about the mine.

La Porte is prepared for winter. At the present time the old mining town is quiet, but during the past summer times were livelier than for years past owing to the inauguration of new mining enterprises and a revival of old ones. This town is the center of a large and very important mining region, one which, even in what are called quiet times, annually produces an amount of gold rising to respectable proportions. However, old citizens like Hon. B. W. Barnes tell of the booming times in the town's early history when its population was large, miners crowding the streets and plenty of gold in every man's pocket.

Wm. S. Schuld and Chas. W. Hendell, two mining and civil engineers, reside at La Porte and do much work in their profession in Plumas and Sierra counties. Both men are largely interested in mines.

Hendell & Packer Mine.—On Slate creek, hut a short distance above the road between La Porte and Port Wine, is a large river-bed placer mine owned by C. W. Hendell, Packer & Son. It consists of both virgin ground and tailings which, during the past 40 years, have been washed into this river gorge from the enormously rich hydraulic mines above. These gentlemen have an undisputed claim to about three miles of this channel. Being successfully operated in this mine is a new and important invention by Mr. Packer and his son. It consists of a hydraulic pipe which delivers, under pressure, water against a wheel similar to the Pelton; of the necessary shafting, to which is attached a pulley over which passes a double endless chain about 12 inches apart, links about ten inches long and toggled together. Between the two chains and eight feet apart, by means of bolts, are attached gravel buckets. The length of this gravel carrier depends upon circumstances. The one in operation was about 100 feet long, the lower end extending down into the mine. While it was running, 20 men were standing on either side shoveling gravel into the buckets, which carried it up to the wheel, and, as the buckets passed over the pulley, the gravel was dumped into a sluice-box, down which the water discharged from the wheel washed the debris, piling it up in the shape of a big levee entirely out of the way. In working gravel that will pay for shoveling, it is a complete success—far superior to the ordinary sluicing process. By this method of working the mine is paying well. Next year the owners will have two machines at work and will operate on a large scale.

The Slate Creek Mine.—Immediately above the mine just referred to is that owned by a syndicate of capitalists and managed by Mr. Boyle. During the past season a flume five feet wide and about four miles long has been completed. It is designed to take up the waters of Slate creek, thus permitting the company, by the use of hydraulic mining elevators, to work the tailings deposited in the canyon in years gone by. These are supposed to contain a large amount of gold; indeed, we understand that they have been prospected and found to be rich. In the working of hydraulic mines doubtless much auriferous cement found its way into the canyon. Gold was swept through the sluices and carried to the bed of Slate creek. The company propose to handle this gravel on a large scale. It promises to be one of the biggest gravel-mining propositions in the State, employing lots of men, expending large sums of money and securing big profits.

Port Wine.—This name is significant. It is related that in early times some parties were transporting a keg of port wine. Letting it fall, a hole was knocked in it. Finding it impossible to stop the leak, they drank heavily of the wasting wine, and with the usual result. To the locality was given the name "Port Wine."

The Pioneer Mine.—About a mile north of Port Wine is the once noted Pioneer mine, operated many years ago, both as a drift and a hydraulic proposition. Col. Baker took out of it large sums of money, as did other parties, approximately $400,000 being realized in all. It was enjoined, ceased operation, and about a year ago was purchased of the late Alexander Montgomery by C. S. Diesen and Judge Cowdery, of San Francisco. During the past year the owners have spent much money in fitting up the property, and in opening tunnels and gangways. They are now drifting south in good pay gravel, which they have been extracting during the past three months. At the end of the tunnel is a 140-foot incline, at the head of which is stationed a 12-horse power gasoline engine. It does the pumping and hoists all the gravel, using ten gallons of gasoline per day, which costs 23 cents per gallon. Mr. Diesen is the superintendent. He has the mine equipped in a most complete and substantial manner. About 40 men are now employed. It is probable that a much larger number will be employed next year.

St. Louis.—Near St. Louis is a drift mine, owned by C. W. Hendell and associates. They have about 30 men employed in development and other work, but as we did not visit the property, no extended reference will be made to it at this time. The town of St. Louis possesses to-day hut little indication of what it used to be, except the evidence of an enormous amount of mining in early days. The village numbering less than 50 people once cast 600 votes.

The Copper Syndicate.

There are the most powerful influences at work in copper, and within a short time the fact will be more generally appreciated than it now is, says the Boston Daily *Advertiser*. The greatest syndicate ever organized is now in full operation. It not only has bankers and capitalists in it of enormous wealth, with Baron Hirsch at the head of them, but included are contracts of enormous magnitude with the French and Russian War Departments, which are preparing for war upon an unprecedented scale. Millions of new guns are now being made for the Russian and French armies, and, when war is declared, millions of pounds of American copper will be stored in Russia and France to be used in the manufacture of cartridges. Russia and France will now use only American copper in their cartridges.

France has, for some years, used only American copper, having by special scientific commission proved that it is the only safe and sure metal to use, and Russia has now come to the same conclusion and will henceforth use only American copper for the cartridges of its army. These are not rumors, but are extraordinary facts. The great copper syndicate is operating with marvelous rapidity. It is only a few months now since they organized, and since July 1st the shipments of American copper have amounted to over 92,113,000 pounds, or a total of 276,339,000 pounds per annum, or a much larger quantity of copper than is produced by all the copper mines here. Let us try to realize the marvelous rapidity of this syndicate in its operations thus far. For the fiscal year ending June 30, 1893, the exports from America were 37,642,000 pounds, against 56,453,000 pounds for the fiscal year ending June 30, 1892, showing a decrease of 18,811,000 pounds up to June 30th of this year. But here comes this startling fact that for the two fiscal years referred to the exports foot up 94,095,000 pounds, while for four months, since July 1st, the exports are within 2,000,000 pounds (or 92,113,000 pounds) of the total exports for these two years!

The syndicate is still buying and must continue to do so, for my information is that their government contracts and their own individual purchases are to foot up 250,000 tons. Cut this down one-half and there is an enormous quantity to buy. These purchases mean that American copper must go higher—that 11, 12 and 13 cents will be reached within three months in short order, and that higher prices than at any time since the French syndicate days are inevitable. When lake copper sells at 15 cents, some of your readers may recall this letter and the valuable hints it threw out.

Mining at the Midwinter Fair.

One of the features of the mining exhibit at the Midwinter Fair will be a great gold column, designed by Superintendent Benjamin, showing the volume of California's $13,000,000,000 gold output. The obelisk will be 77 feet high with a 10-foot base. Other designs are also being prepared for an immense ingot or other columnar forms. Whatever design is selected will be gilded to impress the eye of the beholder at a glance with California's enormous gold output, and in order to make comparisons there will be representations of the bulk of $1,000,000 in minted and unminted gold.

There probably will also be cubical representations of the output of some of the years, showing the decrease caused by the shutting down of hydraulic mining.

The main entrance to California's mining exhibit and one of its most attractive features will be the grand arch and facade of onyx, marble and other California building stones which formed such a notable feature of California's mining exhibit at Chicago. The dimensions and beauty are such as to attract and hold the attention of all visitors and invite them to examine further into the great exhibit. It has an extreme height of 20 feet and a base line of 37 feet. The quarrymen and terra-cotta manufacturers are to be invited to construct from their marble, onyx, terra cotta, tiles and decorative building stones the inclosure for the mining exhibit. Apart from the grand facade there will be 673 linear feet of this inclosing parapet, which will give plenty of opportunity for a comprehensive display of all the mineral products of the State applied to building and decoration.

Amador county has applied to the Executive Committee for 1000 feet of space, and Nevada county for 2000 feet. Calaveras county is arranging an exhibit of copper and iron ores as well as its gold, and asks for all the space possible, and Butte insists upon 400 feet.

Nevada's Day, says the *Examiner*, will be one of the most interesting of the special occasions, and big excursions will then be run from the neighboring State. And Nevada's mining camp will be one of the features of the exposition. It started from Sam Davis' idea of the reproduction of an old frontier newspaper in a characteristic frontier newspaper office. From that has developed one of the most elaborate exhibits that will be made. The Nevada State building will be located close at hand, so that those who are interested in the exhibit from that State will only need to take another step to be in the old-fashioned camp, and there will be seen things just as they saw them in the "good old days" when the tavern, the dancehall, the blacksmith shop and the gambling layout were on the front and only street, with the flumes and the mining tunnel just a few yards away. This '49 mining camp company is in communication with parties all over this State and Nevada in the hope of securing all sorts of early-day relics, for which the buildings of this camp are to be a repository. It is their intention to make the camp a perfect museum which will be of particular interest to people from foreign places, and which will recall to the pioneers the days of long ago. The drawings and specifications for their "Rest for the Weary" hotel are ready for the contractors; also the framework on which Mount Shasta is to be erected, for the famous mountain is to be reproduced with mining tunnels at its base, and with mining operations going on all around it.

Senator Perkins has given for this camp the old cabin he lived in during his early days in Butte county. There will be a six-horse stage coach, with a history of exciting incidents, and the band of Sierra Nevada Indians, who in the early days harassed the miners and emigrants, will smoke the pipe of peace with their erstwhile enemies in camp at the foot of the Shasta model.

Amodor county has sent in a communication stating that a notable county exhibit will be made of its ores, minerals and mining methods, and asking to be allotted all the space possible.

Shasta will require at least 300 feet of space and can easily use more.

Mono county is already arranging its mining exhibit. Though the County Supervisors neglected to make an appropriation to help on the work, the County Commissioners are pushing ahead. One of the great features will be a slab of onyx and travertine weighing 4½ tons. This is from a recently discovered deposit. In addition to this, there will be cubes or ingots representing the county's mineral output, 500 to 1000 pounds of representative ore from each of the principal mines, unique specimens from different districts, views of mines and mining works, and some of the weird curiosities from the Mono lake country.

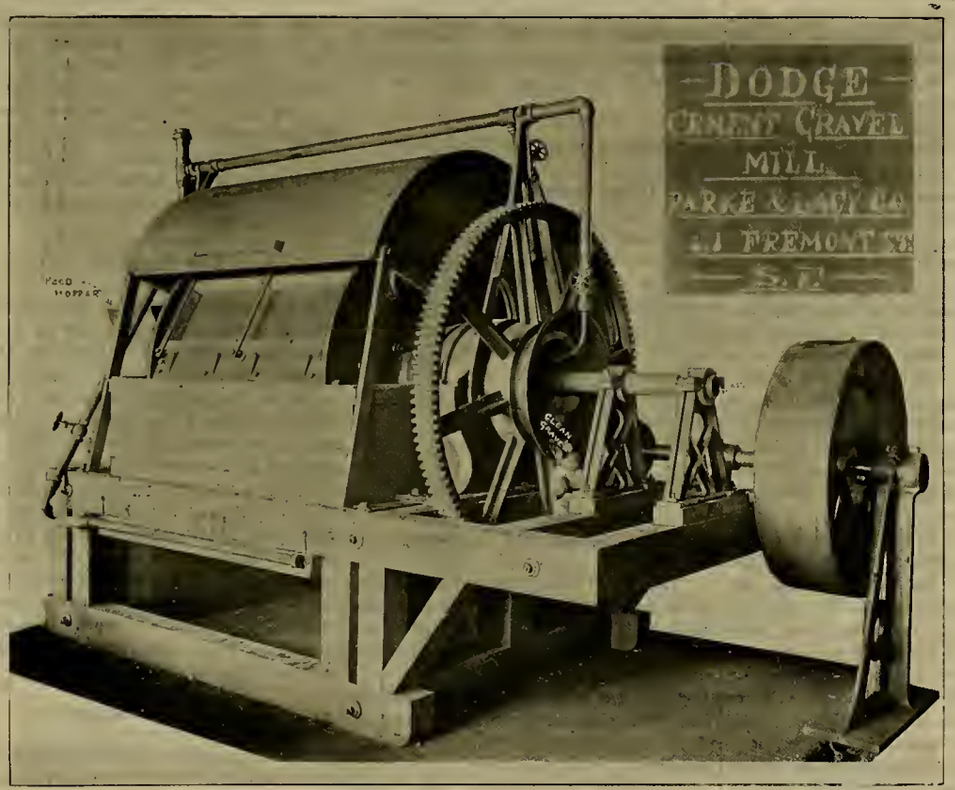
Coal and copper ore will constitute the chief features of Mendocino county's mineral display. Kern county is preparing to send up a lot of the gold-bearing gravel from the Mojave desert and have it worked by a dry-washing

machine to illustrate this branch of the mining industry. The county will also make an extensive exhibit of gold ores, asphaltum and its varnishes, oil and sulphur, green and gray sandstone, building granite and marble.

The work of raising $25,000 for the exhibit is progressing. The Utica mines, of Calaveras county, have headed the list with $1,000. The Kennedy Mining and Milling Company has given $500. This Amador county mine has been turning out $50,000 in dividends every month for some time. W. W. Stow, who owns the Gold Bank mine of Forbestown, Butte county, has given $250. The Bank of California's subscription is $250, and other banks have promised to be equally liberal. Other subscriptions are as follows: Sierra Buttes Mining Company, $100; Miller, Sloss & Scott, $100; Huntington, Hopkins & Co., $100; D. H. Burns, $100; John A. Roebling Sons & Co., $50; Washburn & Moen Manufacturing Company, $50; California Wire Works, $50; Thomas Flint Jr., $50. Martin Jones, one of the members of the finance committee, has reported that he has $325 on his books in addition to these subscriptions. Both the Selby Smelting and Lead Company and the San Francisco Stock and Exchange Board have promised to subscribe liberally.

A New Gravel Mill.

Many of the old river beds of California are rich in what is termed "cemented gravel," which consists of large barren



boulders of quartz, diorite or porphyry which have been cemented together by alluvial deposits that are rich in gold. To separate the cementing material from the barren boulders or gravel has not been easy of accomplishment. The stamp-mill has been largely used for crushing this material, but a proportion of small boulders and rock cannot avoid being crushed. Another method used is to sluice the material, and, by successive drops in the sluices, a part of the "cement" is rubbed off the boulders. This, however, is crude and not to be depended on, as cemented gravel will be carried a long way in water before the cement is disintegrated.

The "Dodge gravel mill" is a modification of the "Dodge" pulverizer, the main difference being that the opening in the journal opposite the feed end is made much larger than the feed opening, but concentric with it. Obviously, when the machine is filled up to the periphery of the feed opening, the boulders will drop out at the other end into cars, and in travelling the length of the machine (four feet) the cement is crushed and washed off the gravel and passes through the screens. The gravel being very hard, aids in the crushing as it is thrown around in the revolving cylinder. The pulp which passes through the screens of the mill goes through a coarse gold trap, where the coarser particles of gold are saved without the use of quicksilver, after which it flows over the silver-plated copper plates, terminating in a quicksilver trap, which saves all the quicksilver or amalgam that may drain off the plates. As all the amalgamation takes place outside of the mill, there is no loss by flouring of quicksilver. It is claimed by the makers that the capacity of this mill will be fully five times greater than that of a ten-stamp mill on the same cemented gravel, and that the wear and tear and power required will be correspondingly less, due to the barren gravel itself not being crushed.

The Raber Machine at Work.

The Raber flour-gold saving device has been put in operation on the Snake, and has, it appears, demonstrated its value. The editor of the Caldwell *Tribune* visited the scene of operations, and thus reports his findings:

The machine is not a machine at all. It has none of the characteristics usually understood when speaking of machinery, as will be seen from the description. The ground being worked, as before stated, is on Mr. Paul's premises on the bank of Snake river, near the first Snake river bridge below Caldwell. A threshing-machine traction engine is used for generating power which runs a small dynamo. From the dynamo an electric current of about three amperes is conducted to the amalgamator or gold-saving apparatus. The gravel from the river bar is scraped on a dump and shoveled into a sluice or flume which has a perforated bottom, called by miners a grizzly, into which a small stream of water flows. The fine sand, gold and water pass through the grizzly, while the coarser pebbles are raked off and carried down a shoot which holds a larger stream of water. After the fine sand, etc., passes through the grizzly it is carried through a flume over the amalgamator, which opens out fan shaped and has a number of wooden checks, which serve to spread out the water to a depth of about one-eighth of an inch. The water, sand and gold then flow over a copper plate and drop into a little trough, about four inches deep, in which is contained the sensitized mercury, or quicksilver. The little troughs are fitted with check gates which cause the water, after falling into them and before escaping, to peform a sort of rotary or churning motion. The copper plates, arranged like ordinary stair steps, are about 14 inches wide and five feet long, and there are five of them. The water, sand, etc., being spread out before reaching the first plate, flow over it and drop into the trough and are brought into contact with the mercury. This is repeated five times, and evidently every particle of matter contained in the water must come in contact with the chemicals deposited in troughs. The chemical used is, of course, the inventor's secret, but he does not hesitate to say that sodium in some form is the basis. No doubt electricity also plays an important part in the operation.

The practical workings of the apparatus seem to be extremely simple. In order to test its efficacy, gentlemen who were present washed a number of pans of the gravel taken directly from the river bar, each of which showed gold in more or less quantity, but after repeated washing of the sand which had passed through the amalgamator, no trace of gold was found, except in one instance where a single color was seen; but, as the same pan had been used for washing bar gravel, it is supposable that a particle of gold had adhered to the pan. We took occasion to calculate the amount of gravel that could be handled, and by actual timing it was shown that about 200 pounds per minute was a conservative estimate. This would amount to six tons per hour, or 60 tons per day of ten hours. Under favorable conditions, four men could easily operate the machine, and other expenses, including royalty, should not exceed $5 per day, making a total running expense of $17 per day. The plant will probably cost, put in operation, about $1000 where each machine is operated independently. But this cost can be greatly reduced where electricity can be furnished from a central station. It is estimated that the gravel will pay about $1 to the ton, but it would seem that at 75 cents, or even 50 cents, it could be worked profitably. However, the main questions for consideration at present are: First, is the gold in the sand? Second, will the apparatus save it? And third, is it practicable? To the first there is but one answer—the gold is unquestionably there; to the second, there is gold in the sand before it enters the machine, but there is none in it when it comes out—the gold must be saved; to the third, every appearance is favorable. Mr. Raber, the inventor, informed us that the cost of the chemicals would not exceed ten cents per day. Now with respect to terms of procuring machines: As we understand it, no machines will be sold outright, but the first cost for putting up will be between $400 and $500, and thereafter $1 per day royalty must be paid. These figures do not include cost of power and dynamo. At present the company have no machines amalgamators rather, to dispose of, as those on hand have already been taken. Ten of them will be placed between Lannan's Spur and Caldwell during the coming winter.

Utilization of Water Power by Electricity.

In a paper read at the recent meeting of the British Association for the Advancement of Science, by Mr. A. B. Snell, it was said that with coal at the average price of the last ten years, it is not probable that water power will prove much cheaper when the capital invested, cost of maintenance of the electrical plant and interest are taken into account.

The most important instance of the application of water power for the electrical transmission of power in Great Britain is that at the Greenside silver-lead mines in Cumberland. The fall at the station is equal to a vertical head of 400 feet, and the effective horse-power is about 200. The generating station contains one of Gilkes & Co.'s vortex turbines of 100-horse power, driving a compound dynamo. The current is conveyed by bare copper conductors on poles, the distance being six furlongs to where it enters the mine at an elevation of 1850 feet above the sea level. The conductors from this point are insulated, and covered with lead. About three-quarters of a mile in the mine, or one and a half miles from the dynamo, a nine-horse power series motor works a three-throw pump, forcing the water 360 feet in height. Half-way between these motors the pressure is reduced from 600 to 250 volts for working an electro-locomotive in the lowest level of the mines, through which the water pumped from the 120 yards level, and the whole of the water used by two hydraulic winding engines is pumped. The total weight of the locomotive when loaded is 18 tons. The conductors in the level are phosphor-bronze wires. Great difficulty was experienced in fixing this plant. All main stations in the mine are lighted by incandescent lamps in series of six.

In the discussion which followed the reading of this paper Professor Unwin said that in America many electric plants are being worked by water fall. In the Calumet and Hecla mines power was transmitted electrically, it having been tried on a very large scale, but the engineer had come to the conclusion that it was very expensive, and in future it was proposed to go back to air.

Mr. Kapp said that in Switzerland electricity was now used in transmitting the power obtained from the Rhine. At 700 volts, 700-horse power was transmitted at the cost of 50 francs per horse-power per year.

Mr. Carter pointed out that England did not present many favorable cases for the use of water power, owing chiefly to the low head and variable flow.

As bearing very closely on this subject the *Colliery Engineer* refers to the paper of Mr. F. O. Blackwell read at the Chicago International Engineering Congress, and published in the Transactions of the American Institute of Mining Engineers, in which he gives as an example of transmission of water power by electricity, the Virginius mine at Ouray, Colorado, where 300-horse power is carried at 800 volts from a water power four miles distant. The cost of coal at the mine he said was formerly $18 per ton, which would amount for the present plant, to about $80,000 per year, equaling the total cost of the electric plant. The item of fuel was a complete saving, the expense of operating the steam and electric plant being about the same in other respects.

Mechanical Progress.

Bursting of Fly Wheels.

In a comparatively short time a large number of fly wheels have gone to pieces while running, says the *Manufacturers' Gazette*. The loss of property, time and life has been great. In one case $100,000 would not cover the loss. Why are these failures of wheels to hold together so frequent? Of these, while some had run for years, others were of recent construction, made since the era of high-speed engines. The work done by the engines was not all the same; they furnished power for cotton-mills, machine shops, electric-light stations, electric-power stations for street railroads and for other work. They were not all of the same class of engioes, the makers being widely scattered.

There is a reason for these failures, which should be found and remedied. The strains developed in fly wheels and pulleys are of an extremely complex nature, arising from many causes, so that the numerous rules and formulæ employed for proportioning them are almost entirely empirical in character. Experience and judgment have dictated largely the thickness of the rim, while the eye has played an important part in deriving the shape and taper of the arms. In text books on machine designs are found analyses of the strains in pulley arms due either to the pull of belt, the inertia of the rim or the centrifugal pull of the arms due to weight of rim, etc. These text-books also state that the strength of the rim is not affected by its thickness as regards centrifugal force; for, with increase of thickness, there goes an increase of weight, with a corresponding increase of centrifugal force and area of cross-sctlon to resist it. From this reasoning, wheels of good metal, perfectly true and in good running balance, are only limited in speed by a periphery velocity roughly assumed at about one mile per minute or 88 feet per second, a speed giving a low strain per square inch of section of rim, to wit, about 800 pounds per square inch. Yet, in view of these statements, wheels burst at low speed, others run and do not break at very high speed. Much has been written, many formulas deducted, and theories proven on paper why wheels break. Without going into argument, it is safe to say that a wheel can be made that will stand. Wheels are and have been running for years at a very high speed. A wheel 17 feet 9 inches, running at 7500 feet of rim speed per minute, band-saws with rims 8 and 9 feet in diameter, are running as high as 10,000 feet per minute. These wheels are cast iron throughout, heavy, and with a large number of arms. Many machines with wheels up to five feet in diameter run 11,000 feet per minute as a rim speed. If a bridge truss or mill floor is to be built, they can be calculated so as to be able to carry any load, the truss or floor resting on butments, walls, piers or posts for support. The rim of a wheel is practically the same as the truss or floor; it rests upon supports, which are the arms. First, make the arms as stiff and rigid in proportion as supports put under a floor; then make the rim of sufficient thickness, and no matter how fast the wheel may go it cannot break. A wheel should be put in that should not break under any strain that might arise from a speed given it by an engine, even though the engine run at the fastest speed it could attain from running away. An engineer would feel much aggrieved if it were hinted that he could not calculate the power of an engine so that any power required could be built, but when it comes to fly wheels he simply guesses and goes along. If the wheel breaks, great is the mystery. If it does not break, nothing is said. All engineers do not guess, for there are many good wheels built, and it is to be hoped that in the future all wheels will be good, but there are many wheels running to-day that should not be allowed to make another turn. If the owners of fast-running wheels will have their wheels examined by a competent engineer, and where wheels are found to be unsafe have them replaced by wheels of proper strength, much money, time and life will be saved, for the breaking of wheels will continue as long as there are weak wheels and a chance for engines to be overloaded or to run away.

Fastest Vessel in the Queen's Navy.

The recent rapid performances of the cruisers Columbia and Olympia—one on the Atlantic, the other on the Pacific—make the following, from the London *Engineer*, of especial interest. The types of vessel are so divergent, however, that comparisons are unfair.

We have the pleasure to record the successful official trial on Saturday last of H. M. S. "Havock," built by Messrs. Yarrow & Co. This trial was looked forward to with more than usual interest, the "Havock" being the first of twelve similar vessels of an entirely new and distinctive type, which are being built by private contract for the British Admiralty. They have been designed by Mr. W. H. White, Director of Naval Construction, and are intended to be superior to other fast vessels building by foreign powers, who, it is well known, have made great advances of late in the construction of such vessels. The name given to this new type is that of "torpedo-boat destroyer." They are intended to act against torpedo boats, and to have a speed superior to that possessed by such craft at the present time, and, what is of the highest importance, to be capable of maintaining that speed at sea, in which torpedo boats have been found to be sadly deficient. Their coal-carrying capacity will enable them to have a radius of action far greater than the present torpedo boats, and to test by practical experience how far the "Havock" can operate from a base, a further slow-speed trial is to take place at the end of this week. The "Havock" is called after a famous warship of some hundred years ago, and is 180 feet long by 18 feet 6 inches beam, and about 200 tons displacement. She has two sets of triple-expansion engines, with cylinders 18 inches, 26 inches and 39½ inches in diameter by 26-inch stroke, designed to give 3500-horse power at 400 revolutions per minute. They drive twin screws, having three manganese-bronze blades, 6 feet 2 inches in diameter. Her boilers are two in number and of the locomotive type, one to each set of engines, in separate stokeholds, forced draught being supplied to them by two fans by Allen & Co., and are designed for a working pressure of 180 pounds per square inch. Her guaranteed speed is 26 knots on a continuous run of three hours. This the "Havock" easily exceeded on Saturday, in spite of a very heavy sea—the water finding its way even into the engine-room—when she attained a mean speed during the three hours of 26¼ knots, the boilers keeping a plentiful supply of steam with the pressures ranging from 160 pounds to 170 pounds, and the engines averaging 360 revolutions per minute. Everything worked very satisfactorily with the exception of a slight mishap to one of the circulating pumps, which compelled the engines to be run for the latter half of the trial without the water service to the bearings, thrust, etc. Nevertheless no trouble was caused by overheating, and the trial finished successfully. The armament of the "Havock" consists of one 12-pounder quick-firing gun, mounted on the conning tower forward, and three 6-pounder, quick-firing guns, one on each side forward, and one aft on a high pivot. She also has one fixed bow torpedo tube and two revolving deck tubes, 18 inches in diameter. She carries an electric search light, supplied with current from one of Allen's dynamos, placed in the engine-room, where are also the air compressors, evaporator, steering engine, etc. Messrs. Yarrow & Co. are also building a sister ship, the "Hornet," to be supplied with Yarrow's patent tubulous boilers, and her speed is expected to be 27 knots.

An Ingenious Water-Wheel.

An order has been given for a power plant of the following description by a Minneapolis man, for use upon a small river in Minnesota. Three canoes are to be anchored abreast in midstream, about eight feet apart, and they will sustain the shafting on which two paddle wheels revolve. The current will run these wheels, gearing will convey to a driving wheel in one of the boats the power developed, and a wire cable will complete the transmission to the shore. Pains will be taken to keep the paddle shaft at right angles to the current. In order to submerge the wheels sufficiently, the canoes will be partly filled with water, the amount being regulated by water-tight compartments. Each paddle has a superficial area of 30 square feet, which, when wholly immersed in a rapid current, must withstand a considerable strain. The arrangement is such that the average turning effect is about equal to 60 square feet, immersed all the time.

Harvey Process for Steel Rails.

The Harvey process of hardening steel for armor plates reaches only the surface or skin of the metal. Just before his recent death, the inventor took out a patent for applying the same method to toughening the top of steel rails. He provides a way for introducing about five per cent of carbon into the upper part of the head, from 2½ to 4 per cent into the lower part and into the web, and less than two per cent into the base or flange.

Scientific Progress.

Jupiter and His Satellites.

"The Planet Jupiter and the Phenomena of his Satellites" was the subject of Professor E. E. Barnard's lecture on astronomy at the First Unitarian Church, in this city, recently.

The lecture was illustrated with stereopticon views and charts, which made all the phenomena described extremely clear to the audience.

The reasons for concluding that Jupiter is of much less density than the earth were first explained, and then the lecturer went on to describe the surface of the planet and the reasons why so little is actually known about the materials of which its surface consists.

"The spectroscope gives us little information about Jupiter. When we examine the spectrum of Jupiter, like that of the moon, it is only reflected sunlight. Certain elements, however, lead us to believe that the planet is surrounded by a dense atmosphere.

"We can observe a great difference between Jupiter and Mars. The latter has well-marked features, which in all probabilities are seas and continents. Jupiter's markings are not like those of Mars. Dark bands like belts surround the planet. No markings were discovered till 1630, when two prominent ones were located on each side of the equator. Other belts were afterward seen crossing the poles. These belts consist apparently of clouds."

The lecturer went on to describe other markings of Jupiter's surface, especially the bright spots prominent in the planet's southern hemisphere and the black spots in his northern hemisphere, the locations and forms of which are changing all the time. "All these markings have different motions. A year is a long time for a spot to remain visible.

"The phenomenon of a bright red spot was first noticed on Jupiter's surface in 1874. It was calculated to be about 30,000 miles long and about 7000 miles wide. In 1880 it was still visible, but in 1882 it had begun to fade and be obscured with a white mist. Ten years later it became clearer, and is still visible, although a little difficult to see.

"There are various theories to account for these phenomena. It is supposed that Jupiter is in an intensely heated condition midway between the temperature of the earth and that of the sun. All the water on the planet is converted into steam, and we look not upon Jupiter, but upon a steam vapor."

The professor further stated that his own observations led him to the conclusion that it was not the actual surface of the planet itself that could be seen through the telescope.

The rest of the lecture was devoted to an interesting account of Jupiter's five satellites. The existence of four of these bodies has long been known—indeed, the velocity of light was first determined by the eclipses of Jupiter's satellites. The fifth moon, which was recently discovered, is only 100 miles in circumference. It is so small as scarcely to be visible and revolves around the planet with immense velocity.

The last subject touched upon was the comets captured by Jupiter's attraction out of their original orbits and brought within the solar system.

New Explosive.

A new explosive, invented by Dr. Ochse, who was formerly connected with the Krupp works, has caused a fall in Dynamite Trust shares. The new invention consists of an explosive gas cartridge formed of a glass tube, containing a few grammes of water, which, by electricity, is conveyed through a platinum contact and is decomposed into elements of vapor oxygen, which produce an explosive gas. The pressure can be produced according to requirements up to 5800 present atmospheric pressure. The experiments which have already been made by the military authorities with the new explosive have been successful, and show that it possesses the quality of safety, and that it is far-reaching in its effect.

Balloon Photography.

Discoursing on "Balloon Photography," with special reference to military objects, Captain A. M. Mantel observes that the difficulty of photographic work is much greater in a captive balloon than in a free one, the latter being steadier. When the wind speed is more than 16 miles an hour, there is, he says, but little hope of satisfactory photography from a captive balloon, although such a speed is but little hindrance to work from a free balloon. The mere movement of translation has very little blurring influence, but the gyratory movement of the balloon sometimes gives trouble; this is, however, more pronounced when the balloon rises or falls.

To Save Lives at Sea.

A new apparatus for saving life at sea consists of a structure which, when fitted on shipboard, serves all the purposes of a bridge and chart house, or an ordinary deck house, but which can be released with two or three revolutions of the disengaging screw, and at once made available as a refuge from the sinking ship. It is secured to the deck beams by strong, tested steel stretching screws, and is constructed of light steel plates, with strong T-iron frames running longitudinally and transversely, and having ballast tanks, regulated by step valves to adjust the draught of water. It is named the "Refuge," and is an English invention.

Heating and Lighting Street Railway Cars.

Methods of heating and lighting street railway cars were considered in a report by Mr. G. F. Greenwood to the American Street Railway Association, lo which are given results of investigations by the anthor in regard to the expense of several of the methods described.

Three methods of heating are discussed: First, primary heaters, or those in which the heat is obtalned from fuel consumed on the car; second, secondary heaters, in which the heat is generated elsewhere and transmitted through some storing medium in the car; third, electric heaters.

Good heaters of the first class can be purchased at from $15 to $24 per car, and can be installed at a cost of ahout $1.50 per car.

The cost of operating these per car day of 18 honrs, with fuel at $4.75 per ton, lahor at $1.50 per day, aod maintenance at 25 per cent of the cost of stoves, is, for fuel, 8.7 cents; maintenance, 3.8 cents; labor, 3 cents; or 15.5 cents per day per car. In the second method there are two types, one using steam, the other water. In the first steam is nsed to heat earthenware cylinders or tuhes placed in iron pipes, and in the other heated water is forced into radiatiog tuhes in the cars placed along or under the seats; a reservoir on the car is charged with steam or hot water at a charging station. As this type of heating is stated to be at preseot in an emhryo state, reliable figures are not given as to cost of operation. Electric heaters can he installed at a cost per car varying from $35 to $46. To keep the temperature at, say, 50° Fahr. in moderately cold weather requires an expenditure of 2.66-horse power, and in severe weather from ahout 5.33 to 6.66-horse power, estimating the cost of power to he .9 of a cent per kilowatt hour (.7 cent per horse-power hour), the cost of heating a car per day of 18 hours is given at 32.4 cents, 64.8 cents and 81 cents, respectively, on the above hasis of power consumed. To these figures must be added 20 per cent for depreciation and repalrs, which will amount to ahout 5.1 cents more per day.

Considering all the elements that enter into the question of heating cars, the conclnsion is arrived at that the best method is that of using a primary heater fired with anthracite coal and operated from the inside of the car.

Three methods of lighting street railway cars are mentioned—using oil lamps, the electric system, aod the gas system—and of these only the two latter are considered.

It is advised that an incandescent light be placed in each lamp-box at the end of a car, so that the signal light may he distinguished readily, and to illumine the advertisiog rack over the window. On the ceiling there may be two incandescent lamps located about four feet from each end, and by having a divided circuit the fifth light can be used in headlights on the hoods of the cars. The result is that there is a minimum numher of incandescent lights in the cars, the hest lighting effect is ohtained, and the annoyance of oil headlights and labor attending their use is removed. The cost of lighting by this method need not he over one-half cent per hour, or four cents per car per day, estimating that the car uses its light eight hours every day.

The third method, that of using gas, is well spoken of, but, owing to lack of experience, no data are given in regard to the same.

In conclusion, the opinion is expressed that the best method of heating street railway cars is by the use of a primary heater or stove, and that for lighting the use of such lights as can he secured in connection with application of electricity as a motive power, or a reliable gas system, provided the latter can be operated economically.

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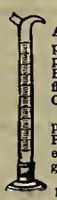

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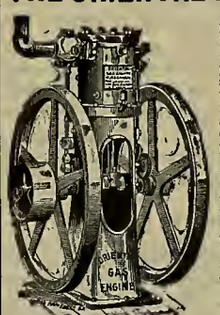

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Electricity.

The Electric Canal Boats.

The late trial on the Erie canal of cana boats propelled by electricity is thus described by the *Electric Review*, and is somewhat more complete than our previous notice:

The first public trial of the Frank W. Hawley, the canal boat propelled by electricity, took place at Pittsford, New York, on the Erie canal, between locks 63 and 64, on Saturday, November 18th. The State of New York appropriated the sum of $10,000 toward experimenting upon the application of electricity to canal-boat propulsion. It had been thought by many that the use of a propeller in a canal would be detrimental to the bank, that the repeated swash and beating of the water against the walls of the canal would be so destructive that it would not be advisable to employ a rotary motion for moving the boats. This theory took such a hold that for some reason the use of motors on canal boats was not thought practicable. Then, again, the installation of central stations was deemed too expensive an outlay to be considered economical. For these reasons nothing was done in this respect; but, with the advent of the Niagara Falls Power Company, the facilities thus offered for canal-boat propulsion made the scheme plausible.

With the power available there could be no reason why the apparatus should not be perfectly successful in its operation. The Frank W. Hawley, an ordinary canal boat, was provided with Westinghouse motors similar to those used on their street cars. Two trolley arms were used, as it was not thought advisable to use the water for the return circuit. A temporary trolley line was erected, having, of course, two overhead wires.

When all was ready for the trip a preparatory trial was made Friday evening, to be sure that everything was in working order.

A prominent engineer who was present at the trial declared that he could see no possible reason why electricity should not supplant the patient mule, and that the apparatus, being no departure from the ordinary, should not operate to perfection. The steering of the boat is not in the least affected, and no driver is necessary in any emergency. Trailers may be attached and one boat may serve to draw six or seven heavily loaded boats. The motors used will be calculated for about 500 volts, and it is not stated what the exact design will be to be applicable to this departure.

In this trial trip the power was obtained from the Rochester Street Railway Company's power house, whose mains generally carry about 500 volts, but only 400 were employed at the boat.

It is merely a question of time and the amount of available current furnished when the entire canal system will be operated by electricity. Difficulties may arise which, of course, cannot be foreseen, and which only actual experience can enable the engineers to obviate, but as this is the first application of electricity obtained from a central station, to the motive power of boats, a field is thus opened which is full of possibilities.

Storage Battery Cars.

The experimental use of storage battery motors on the Second avenue surface road in New York since last May has been the subject of interesting comment in electrical journals. The trial appears to have been a thorough one. Six cars have been in use and they have run more than 40,000 miles. Since August 1st they have been moving on five minutes' headway for about eleven hours a day, and during the entire period traffic on the road has never been delayed, and the cars have not missed one-half of one per cent of their schedule trips. Up to this time the storage cars have been running between Ninety-sixth street and Harlem river, but now they are to come down town as far as Astor place.

Each car carries a battery of 144 cells arranged in two trays, which are introduced through openings at the end of the car, and are placed under the seats one tray on each side. Sixteen of the cells are in a separate circuit, and at night they serve to maintain incandescent lamps. Each car runs about three hours before the charge is exhausted, and the batteries are changed in four minutes by machinery which is operated by electricity and handled by one man. We take from the *Electrical World* the following description of the device by which the movements of the car are controlled:

"The controller has seven points; when the pointer is at the zero mark, the pointer is off entirely; when on the first point, the armature is short-circuited on itself, and by means of this, on the reverse, motion, the car can be stopped in a short distance by the breaking action of the motor acting as a dynamo; when on the second point, the cells are in multiple in four sections; when on the third point two sections of the battery are in multiple and two in series; on the next two points the fields are weakened, thus giving two further increases of speed. In stopping the car the action is to reverse that just described, and there is a reversing point beyond the zero. As will be seen this gives a very thorough control of the speed, and in actual operation, as has been demonstrated, by a lengthy trial, the cars stopped from full spead ahead in 25 feet."

Full speed is ordinarily 12 miles an hour, and the operator's power to stop the car easily within so short a distance tends to prevent such accidents as take place every day on trolley roads. The company has published a complete statement of the cost of operating these six cars, from which it appears that the entire expense has been 9.32 cents per car mile. It is also shown that the plant used is capable of keeping 18 cars in operation, and a frank statement as to the cost when 18 cars are used reduces the expense to 5.29 cents per car mile. This estimate is regarded by such authorities as the *Electrical World* and the *Electrical Engineer* as a conservative one. We have not at hand any statements of cost per car mile under the trolley system with which these figures may be compared, but the comments of the two journals already mentioned are very encouraging to those who hope to see the storage battery system in general use. The *Electrical World* says that "the results" of the trial "have been very encouraging, and that, even on the comparatively small scale on which it has been conducted, the cost per car mile compares favorably with some methods of street railway traction, and is cheaper than others."

To Harness the Bosphorus.

There is a certain Greek engineer, now resident in Europe, who ought to have been an American, says *Electricity*, for he is the author of just the kind of scheme that, in the matter of boldness and picturesqueness, the world at large looks to Yankeeland to originate. At various points on the Bosphorus the current from the Black sea to the Mediterranean has prodigious force, and it is now proposed to harness some of this waste power for the lighting of the city of Constantinople and a considerable length of the adjacent coast by electricity. The way in which the inventor intends to turn the ocean currents to account is to erect three very powerful dynamo machines upon the three points of the Bosphorus where the current has the greatest force, and, so far as can at present be learned, the project appears to be practical and realizable. It is stated that a company of capitalists has been formed, the necessary funds subscribed and application for a concession addressed to the Turkish Government. It is understood that the Government has taken the project into consideration and has nominated a commission to report on it.

Useful Information.

How Diamonds Are Cut.

The first operation in the art of diamond-cutting is that of splitting or cleaving, says an exchange. The process consists in determining the proper plan and direction for dividing the stone to give it the final shape it will assume, without needlessly sacrificing any of the weight of the stone. On the sound judgment and skill of the splitter—qualifications gained by long experience—the future of the stone depends. He decides how the stone must be shaped so as to retain the highest weight with the most brilliant effect. He examines it for flaws and defects, and must be able to know to a certainty whether the imperfections are at the surface or in the heart of the stone. Having made his decision, he proceeds to work. The rough stone is imbedded in cement and a dull edge diamond is rubbed across its surface, so as to leave an indentation that determines the line of cleavage. The operation is then repeated with a diamond having a slightly sharper edge, and finally one as keen as a razor. A marked depression is thus made, into which a sharp steel knife is inserted. A quick and light blow divides the stone into two parts. It is now removed from the cement; the main part is then replaced in the cement and another fragment is split off, and these operations are repeated until all the flaws are removed and the stone has received the proper outlines of the form it is destined ultimately to take on. The fragments are all carefully preserved, to be cut into tiny gems, and for other uses.

The next operation is that of cutting, during which the stone receives its finished outlines. This work is still almost entirely done by hand. The cutter has two diamonds attached by cement to wooden handles, and a box in which to collect the diamond dust. The cutter must laboriously grind the two stones together in order that by their mutual attrition he may develop, from the primitive form received from the splitter, the facets of the brilliant or rose form that the stone is required to take. This work requires great muscular force, and the hands of the cutter must be protected by stiff gloves of leather.

An Important Link.

A railroad to connect the eastern coast of Mexico with her Pacific seaboard, over the Isthmus of Tehuantepec, may soon be an accomplished fact, now that a contract to build the remaining 35 miles of road has been signed by the well-known English capitalist and builder of American railway lines, Chandos Stanhope. The new route will tap the rich coffee-growing country on the southern and western slope of the Mexican Cordilleras. At the present time freights on the coffee of southern Mexico are cheaper to London than they are to New Orleans. The new line will bring the product almost to our doors; steamers will be enabled to load on the eastern coast, whence it is scarcely a day's sail to Galveston, and but little more to New Orleans, and those cities will then become great points of distribution. Besides a possible cut in the price of coffee in the American market, the new road will have a further important effect in breaking down the monopoly of the Panama railroad.

To Stand an Egg on End.

A contributor to the *Scientific American* gives the following: My method of standing an egg on end is not by cracking it, but by taking the egg in one hand and striking it in the other three or four strong licks, which readily breaks the thin membrane separating the air from the end of the egg; it also breaks up the yolk of the egg; the parts of the contents of the egg being thus free to move among themselves, the heavier ones settle to the bottom, the lighter ones above, and the air at the top. This is done by placing the egg on end a few seconds and holding it perpendicularly. The center of gravity is thus easily brought within the base, and the egg stands readily on either end. I find that this is a fact that is known by but few. It is sometimes used by jugglers who pretend to conjure by incantations.

The Berlin Sewage Farms.

The city of Berlin is absolutely cholera-proof, writes Mr. Poultney Bigelow in the *Cosmopolitan*. Beside that, she disposes of all the sewage within her borders at a profit of two per cent. The city of Berlin, nearly 20 years ago, purchased some thousands of acres of flat sand-wastes adjacent to her boundaries. With these she began the experiment of utilizing sewage. The city was divided into districts. In each district the sewage flows into an immense cesspool. Thence it is removed by powerful pumping machinery to the fields of the sand-wastes and spread upon them.

There are no "barnacle politicians" in Berlin to hang on and ruin the workings of the municipal Government, Mr. Bigelow says. The administration of the sewage farms is in the hands of citizens of the highest respectability, and under their management the result has grown to be an object lesson to all the cities of the earth. The pumps work night and day. The lands irrigated by the sewage ditches are cultivated in grain and vegetables. The product is the finest by far that appears in the Berlin markets, and is the most in demand. Land about Berlin in its natural state, before the sewage irrigation was applied to it, was worth $182 per acre. As soon as it is put under the operation of the gigantic pumping works, however, it immediately rises in value to $400.

Bits of Information.

No bird can fly backward without turning.

New York contains more Hebrews than there are in Jerusalem.

In 1721 an English law was passed against calico, fining wearer and seller.

Noah's ark was bigger than the Great Eastern and it proved to be a perfect success

In 12 marriages out of every 100, one of the parties has been married before.

The average annual rainfall in the vicinity of Neah bay, Wash., is about 100 inches.

The word "dandy" was first used in England in a poem by Galoway, published in 1780.

No tenable explanation of the manner in which the pyramids were built has ever been given.

The boo tree in the sacred city of Amarapoora, Burmah, is said to be the oldest tree in existence.

It has been calculated that 800 shots were fired for every man wounded during our late Civil War.

If a well could be dug to a depth of 46 miles, the air at the bottom would be as dense as quicksilver.

Massachusetts has more incorporated cities of more than 10,000 inhabitants than any other State in the Union.

Six Months' Food for Paris.

The French Commissariat and the Minister of War have been figuring on another siege of Paris and the amount of food that would necessarily have to be laid in for man and beast. Here are the figures: Breadstuffs, 243,000 tons; meat, 118,100 tons; salt, 14,793 tons; dry vegetables, 34,440 tons; potatoes, 295,260 tons; milk, 6,602,900 cubic meters; coal, 1,000,000 tons; hay, 688,940 tons; oats, 50,052 tons; straw, 68,894 tons.

The above are given as the very lowest estimates on a six months' food supply for

the 3,000,000 human beings and the 2,750,000 domestic animals now within what is known as the outer defense lines." Such a supply would cost $100,000,000.—St. Louis Republic.

The Way to Sit.

When our grandmothers were girls and stralght-backed chairs instead of cushloned divans were the nsual resting places, the young women held themselves with a straightness that was almost stiffness. Then when they grew old they still held themselves like duchesses. For it is the way one sits rather than the exercises one takes that determines the erectness of the figure.

A prominent physician says that the proper sitting position requires that the spine shall he kept straight and that the support needed for the upper part shall he felt in the right place. Therefore, it is necessary to sit as far back in the chair as possible, so that the lower end of the spine shall he hraced against the hack of the seat. If this hack is straight the shoulders will also rest against it; hut even if the shoulders have no point of support, it will he found that they do not need it when the hase of spine is supported properly. This position makes no strain upon the ligaments of the spine. Every organ of the hody is properly fixed hy this attitude.

The feet should rest squarely upon the floor; the hands should rest lightly in the lap, and thns perfect eqnillhrium and rest is secured. The arms should never he crossed, for that position causes a strain upon the spine, places a weight upon the stomach and diaphragm and thus increases the lahor of digestion and respiration.

Once in a while it is a good thing to place the arms hehind the hack, glving, as it does, the fullest expansion to the upper part of the hody.—N. Y. World.

Big Figures.

It is a fact of striklng magnitude that more than $1,200,000,000 of rallroad property in this country is now in the hands of receivers. There is likely to he a general reorganlzation of insolvent railroads, and the Government proposes to take a hand in the reorganization of the Union Pacific, in which it has a creditor's interest of about $52,000,000. Five great railroad systems—the Union Pacific, Northern Pacific, Reading, Erie and Richmond Terminal—which now enjoy the protection of receiverships, have a mileage of 25,000 miles, a combined funded indehtedness of $517,000,000 and aggregate assets exceeding $1,174,000,000.—Pittshnrg Post.

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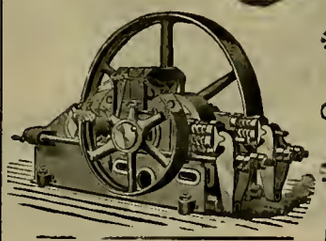

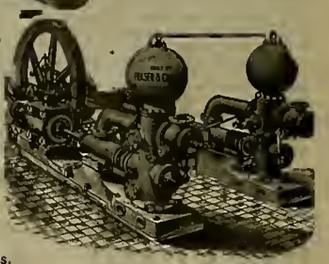

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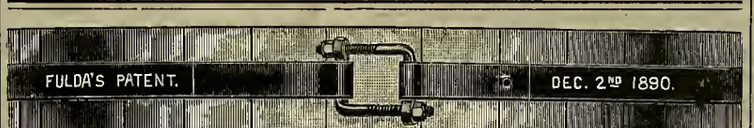

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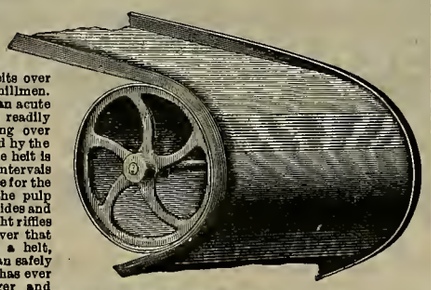

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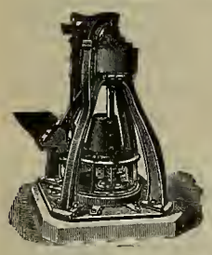

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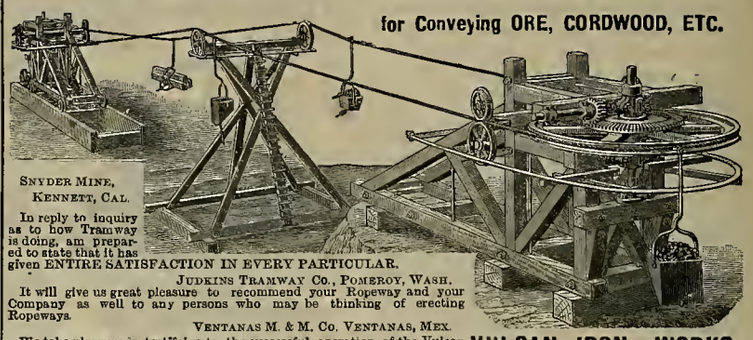

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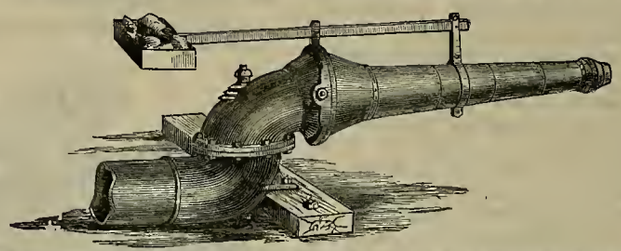

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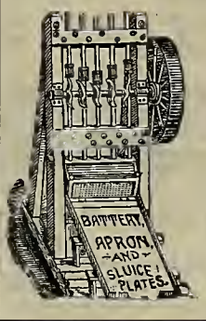

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Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Inyo.

RICH GOLD DISCOVERIES. — Inyo *Independent*: Good gold diggings have recently been discovered in Redrock canyon. About one mile below the stage station a narrow canyon runs north at nearly a right angle to the main canyon. Up that narrow canyon about one mile is the placer ground. The discoverer in four days took out $150. He took the gold to Mojave and sold it there. Then with a partner he started back to his claim, and in two days the two men took out $260. They put the gold-bearing dirt into sacks and carried it down to the stream in Redrock canyon, where they washed it out. Some of the sacks of dirt yielded $40 worth of gold. The report of this rich find had the usual effect of causing a rush to the ground, and last Sunday it was told at the station at Redrock canyon that 200 men were already there prospecting and locating claims. The claim is about 25 miles north from Mojave.

Nevada.

WORK RESUMED.—Grass Valley *Union*: For the past several months the company operating the Centennial mine has been actively engaged in preparatory work, getting ready to carry on mining operations on an extensive scale. The incline shaft has been retimbered throughout and heavy "T" rail laid in the shaft. Until the present time the mine was being pumped out by a powerful Dow steam pump, capable of throwing 12,000 gallons per hour. This steam pump has freed the mine of water to the 400 level. Last Monday an eight-inch Cornish plunger pump was started, and there is a bit of interesting history connected with this pump.

In 1882, the then owners of the mine were having some hot litigation, but it was thought all difficulties would be peacefully and speedily adjusted. Pending the settlement of these troubles the mine was closed down and permitted to fill with water. All the pumps, water column, track and tools were left in the mine and have been submerged for the past 11 years. Now that the water is out, the pumps were found to be in perfect condition, and the eight-inch plunger has resumed work after all these years of idleness.

Yesterday Superintendent Stoddart brought some handsome samples of quartz to town which came from the 300 level. The ore showed plenty of free gold and is rich in sulphurets.

The company operating the Centennial mine is a good one, consisting mostly of Sacramento business men, and they have a valuable property. We expect to hear of very flattering results in the early future.

NEW HOISTING PLANT.—*Union*: The Champion Mining Company of Nevada City has decided to erect new and extensive hoisting works upon the old Merrifield ground.

PROVING A GONEAND.—Nevada City *Transcript*: The opening up of the Original Harmony mine is proving a Godsend to this district. The rich prospects found in this mine gave impetus to other companies to go ahead. After the strike was made in the Harmony, Hon. W. W. Stow and others purchased what was known as the West Harmony, and they have to-day one of the best gravel mines in the State, as the large output of bullion each clean-up fully demonstrates.

Other companies on that ridge were then started up, and the prospects in all of them are very encouraging. Following along up the ridge, work was resumed in the Lupin, and the prospects are very flattering. On Wednesday this company let a contract to Mackerel & Mulloy to extend their tunnel 100 feet, and there can hardly be any question about their striking fine paying gravel in that distance.

If the Lupin and other companies get into good gravel, in all probability in the spring Hon. W. W. Stow will open up two other gravel mines which he owns in that section.

Placer.

A NEW BONANZA.—Colfax *Sentinel*: Within another year eastern Placer will have one of the largest quartz mines in California. The Sterrett mine is located about 12 miles south of Oisco on the North Fork of the American river, between it and Sailor canyon. At the surface there are two ledges separated by a dike and here each ledge has a width of 60 feet. Six hundred feet in from the surface the two ledges come together in one formation and here the ledge is 70 feet in width. Tunnels have been run into the ledge from both the American river and Sailor Canyon sides, 1000 feet each, and besides other prospecting has been done to satisfy the owners that the mine is a bonanza. At present men are at work opening up the mine and putting up buildings and getting out timbers for the large stamp mill and chlorination works to be put up in the spring.

The huge ledge prospects from one wall to the other, both at the surface and all the way to the end of the 1000 foot tunnel. Although generally of a low grade ore, yielding in free gold $2.50 a ton, yet it abounds in sulphurets. In some places the ledge is so mineralized that sulphurets can be taken out by the solid block of three and four feet. In some places the ore has gone over $90 a ton, although it is generally of a low grade. Owing to the immense size of the ledge and its bearing free gold throughout, even the low grade ore can be worked at great profit. Besides with chlorination works the sulphurets will pay well.

The company owning the mine is composed of San Francisco and New York capitalists. Geo. S. Montgomery, the well known San Francisco millionaire is at the head of the company and every preparation is being made to put up an extensive stamp mill and chlorination works as soon as possible in the spring. A 60-stamp mill will be put up at first.

PUSHING THINGS.—Colfax *Sentinel*: The machinery for the Gold Ring mine at Green Valley has all been taken in safely and will soon all be in place. Other improvements, such as putting up necessary buildings, are being pushed with vigor and in about another month everything will be in readiness for active operations.

The Golden Eagle mine at Shady Run, recently purchased from Henry Dresler by A. Rodger of Alta, is being put in condition. At present the necessary buildings for the accommodation of a large number of men are being built and there is every prospect of the mine becoming one of the best in the section.

Geo. Woods, who has charge of the Foss mine at Lowell Hill, has just completed a telegraph line from the mine to Dutch Flat.

The dam for the Polar Star mine at Dutch Flat is completed for this year. The commissioners have the petition of this mine under consideration and a favorable decision is expected soon.

There are still a number of miners at work on the north fork of the American; they are doing well and will work there till high water chases them out.

Plumas.

A BIG ENTERPRISE.—Plumas *Bulletin*: Last week Supt. A. B. White and James O'Brien of the Quincy Mining and Water Company came up from San Francisco to inspect the work done on their property, to pay off the men and to look after other business. The greater part of the work on the 40-mile ditch is completed, and the capacity of the reservoir at the head, by raising the dam, has been increased fully one-third. It is the purpose of the company, next year, to further increase the storage capacity of this reservoir. With these improvements they expect to have a seven-months' supply annually. The big ditch will carry fully 2000 inches of water. It will be seen, therefore, that the company has one of the best water privileges in the State. It covers an immense territory of placer-mining ground, which will require a great many years to work out. The company now owns 2200 acres of this. It is the intention of the corporation to construct, before the winter closes in, a large and substantial restraining dam across Spanish creek, at the Devil's Elbow, so as to protect this valley from the down-flow, not only of debris already in the canyon, but from any that might reach it through future mining operations. Inasmuch as the success and value of its property will depend upon the efficiency of the restraining dams, the company will see to it that they are of a permanent and substantial character. To do otherwise would be to sacrifice, not only their investments, but the certainty of big returns from their mining enterprise, which undoubtedly is one of the best in the State.

Siskiyou.

GOOD QUARTZ LANDE.—Yreka *Journal*: Esstlick & Starr have discovered a fine ledge of quartz at Oro Fino. From five pans of quartz they realized $52 in free gold. The ledge varies from four to five feet in thickness. The Greenhorn blue gravel mining company's hoisting apparatus is now in good working order, with a new shaft. The black sand from the claim containing very fine gold, which cannot be saved in the sluices, is sent below where it is extracted with good success by scientific process, the last lot realizing about a dollar to the pound of sand.

The work of pumping out the old Siskiyou quartz ledge on Humbug, is progressing rapidly. Boyle & Co., at head of north fork of Humbug are now running a new tunnel 200 feet lower down, and another tunnel is also to be run into the old Spencer mine, with good prospects of success. The Punch creek ledge on Humbug, is now being worked by Wight & Co., a Portland firm, who intend to give the ledge a thorough test on an extensive scale.

NEVADA.

Washoe District.

ON THE COMSTOCK.—Virginia *Chronicle*: Mining men who have visited the 1100 level of the Jacket mine say that the ore vein struck in the raise from that level is looking fine and that it is a most promising prospect. The ore is very rich and it has widened in opening up. A good deal of preparatory work has been done at that point during the week, and when the ledge has been opened up farther it may prove to be a bonanza.

The ore mined from the Occidental last week went $54 per ton, assay value. About 10 or 12 tons of this ore is being taken out weekly from the ledge above the 400 level.

The east crosscut on the north boundary of the Best & Belcher is out 30 or 40 feet. It was in soft porphyry at last accounts. Hopes are entertained that this crosscut will open up ore in the north part of the mine.

The Rule drift in Con. Virginia will be advanced only about 20 or 30 feet this week, as a good deal of work in the station had to be finished. The drift will employ four men on a shift instead of three as before stated.

Business at the Con. Virginia is branching out in a most satisfactory manner. This morning the West Con. Company began operations, and the result was the employment of twelve miners—four on a shift—a foreman and superintendent. The first shift went to work at 7 A. M. The superintendent is S. V. Tangerman and the foreman Sam Treglone.

The West Con. will repair the shaft to the 1100 level, open an old north drift and then drift west. After the shaft has been repaired the company will start work on the 800 level of the Con. The stock is not listed at present, but it is presumed that as soon as ore is encountered it will be put on the Board.

The reports of the several Comstock mines for the week ending December 2 are as follows:

CON. CAL. & VA. MINE.—1650 level—The drift running north from the foot of the upraise on the sill floor of this level has been extended during the week 22 feet; total length, 137 feet; face in clay and quartz. The drift running north (at a point 52 feet down) from the winze sunk from the west crosscut from the main northwest drift has been extended 26 feet; total length, 126 feet; in quartz with a little clay. The crosscut running east from this north drift (at a point 40 feet north from the winze) has been extended 28 feet; total length, 121 feet; continuing in porphyry and quartz. In the vicinity of the winze, at a point 20 feet down, there has been extracted during the week 36 carloads of ore—about 34 tons—the average assay value of which is $45.57 per ton.

The southwest drift (the Rule drift) from the 1000-foot station of the Con. Virginia shaft has been advanced 30 feet; face in porphyry, clay and seams of quartz.

OPHIR.—1465 level—The crosscut running west from the main north drift, at a point 124 feet south from the winze station, and about 300 feet north from the main shaft station, has been extended during the week 29 feet; total length, 220 feet; face in porphyry, clay and quartz.

Have continued (jointly with the Mexican Company) the work of making repairs to the main shaft.

MEXICAN.—1465 level—From the top of the upraise which has been carried up 45 feet from the sill floor of this level—at a point 40 feet west from the main north lateral drift and 100 feet north from the south line of the mine—a south drift has been advanced 23 feet; face in porphyry, clay and quartz.

Have continued (jointly with the Ophir Company) the work of making repairs in the Ophir shaft.

UNION MINE.—900 level—The Union Con. and Sierra Nevada joint north drift running from the joint west drift, at a point 1520 feet west from the shaft, has been extended during the week 17 feet; total length, 259 feet; face in porphyry and small streaks of clay and quartz.

UNION SHAFT.—The joint Sierra Nevada and Union north drift from the west drift, 1520 feet west from shaft, 900 level, is out 17 feet; total length, 259 feet; face in porphyry and small stringers of quartz.

SIERRA NEVADA.—The south lateral drift from the intermediate tunnel has been advanced 20 feet; total length, 260 feet; face in porphyry. The joint Sierra Nevada and Union north drift from the west drift, 1520 feet west from shaft, 900 level, is out 17 feet; total length, 259 feet; face in porphyry and small streaks of quartz.

ANNES.—On the 420 level west crosscut from the end of the north drift run from northwest drift from east crosscut No. 1, north, has been advanced 10 feet; total length, 30 feet; formation, quartz and porphyry.

GOULD & CURRY.—200 level—West crosscut No. 5, started in northwest drift, has been extended 10 feet, passing through hard porphyry. total length, 775 feet.

BEST & BELCHER.—200 level—The north drift which was started in west crosscut No. 3, 175 feet from the main north drift, has been extended 12 feet, passing through soft porphyry and stringers of quartz; total length, 26 feet.

900 level—The west crosscut which has been started on our north boundary has been extended 35 feet, passing through soft porphyry; total length, 106 feet.

SAVAGE.—On the 1100 level we are extracting ore of fair grade at several points from the 11th floor up to the 21st floor. The north drift from the station on this level was advanced 18 feet; total length, 59 feet; face in quartz and porphyry. During the week we have hoisted 201 cars of ore. Shipped to the Nevada mill 210 tons and milled 120 tons. Car samples average $24.74 per ton. Battery samples average $23.37. Bullion yield for the week $1988.28. Shipped to the United States mint at Carson, November 25th, 274 pounds of crude bullion. The Nevada mill was stopped from the 22d to the 25th inst. On the 1050 level the east crosscut was advanced 14 feet, making its total length 45 feet. The face is in quartz and porphyry.

HALE & NORCROSS—Main Shaft—Have been easing timbers in main shaft where necessary.

1300 level—We continue stoping out ore from the winze below this level, and extracted during the week 26 cars of ore, assaying $33.71 per ton per car sample, and 13 cars of ore, average assay per car sample $19.57 per ton.

POTOSI.—The east crosscut, 200 feet north of south line, 750 level, is out 120 feet; face in porphyry. The north drift, 35 feet above the 1100 level, is out 108 feet; face in porphyry. The south drift, 200 feet east of Potosi winze, 1100 level, is ont 75 feet; face in porphyry and low-grade quartz.

CHOLLAR.—The north drift, 100 level, is out 192 feet; face in quartz that gives fair assay. Have completed repairs in the west drift, 100 level, and are putting in new timbers in the main incline at the 1100 level.

WASH.—The west drift from the station, 820 level, is out 350 feet from the shaft; face in porphyry and seams of clay.

BULLION.—The west drift from the station, 820 level, Ward shaft, is out 350 feet from the shaft; face in porphyry.

CROWN POINT.—The south drift from the 700-level stope has been advanced 15 feet during the past week, and is out a total distance of 49 feet. The face is in quartz and porphyry, samples of which average from $2 to $7 per ton.

ALPHA.—Are repairing the engine foundation at the Alpha shaft.

EXCHEQUER.—Are repairing the engine foundation at the Exchequer shaft.

KENTUCK.—1100 level—The west crosscut from the south lateral drift is in 44 feet; face in quartz and porphyry. The main south drift in the west ledge is in a total distance of 60 feet from our north line; face in low-grade ore.

SEC. BELCHER.—The drift to the north, from the south raise from the 1100 level, is now out a total distance of seven feet. The quartz in the face is from three to four feet wide, but is low-grade and mixed with considerable porphyry. Started a drift to the south from the raise, 1200 level, and is now out 14 feet. The face is in a mixture of clay porphyry, with small streaks of quartz running through it.

OCCIDENTAL.—During the week we have extracted from the west ledge above the 400 level about one to two tons of ore per day, of the average assay value of $49 per ton. The west crosscut from No. 2 upraise, started at a point 75 feet below the 300 level, is now in a total distance of 148 feet, and continues in porphyry and quartz.

JUSTICE.—The Blane tunnel is now out a total distance of 202 feet, having been advanced 29 feet during the past week. The face is all in quartz, giving low assays, and is a great deal softer than it was last week.

Riley District.

PRONOUNCED A FAKE.—Pioche *Record*: Duncan McDonald, Morgan Williams and others, who left last week for the gold excitement on Muddy, returned last night and report the whole thing to be a fake. Instead of gold-claim locations, hundreds of prospectors and great excitement, as reported, they found only one or two weary prospectors searching for something that would pay to locate, and that something is not yet found. West of the valley, at about the place where rich finds are said to have been uncovered recently, is a large ledge, traceable for miles to the westward, which appears, however, to be barren, and prospecting this is what brought on the recent excitement. Other prospectors who went down from Pioche will return shortly.

Ferguson District.

A $400,000 DEAL.—Pioche *Record*, NOV. 30: On Saturday last, Samuel T. Godbe secured options on the Monitor and Jim Crow properties at Ferguson district, on 90 days' time, and the consideration involved in the transactions is reported to be $450,000. D. A. Reeves, A. C. Ellis and Frank Wilson part with the Monitor, Monitor Dump, west half of the Cliff, the Princess, seven-eighths of the Lucky Bar and three-fourths of the Millionaire claims, on a basis of $300,000 it is said. This still leaves them the April Fool and several other claims lying immediately north of it, of great value in themselves. Messrs. Nesbitt Bros. and Mrs. J. McFadden list seven-eighths of the Jim Crow claim on a reported basis of $150,000.

These properties are regarded now as the cream of Ferguson district, and their transfer into the hands of some company willing to work them will bring Ferguson out as one of the first gold camps of the coast.

The Monitor Dump and the Jim Crow are each working on the same rich ore body, their workings being but a short distance apart on the surface. The side lines of the claims is said to pass directly through the ore deposit. The vein is a fissure in quartzite and porphyry. The strike is about north and south, and the dip is something like one foot in five. Heavy croppings, almost a reef, appear above the tunnel, 40 feet wide. Six or seven feet of these croppings are rich enough in gold to ship to Salt Lake, while the remainder will average $30 a ton. The main working is a tunnel, in now about 530 feet. It was commenced to develop a claim farther up the hill. At 80 feet a 50-foot belt of porphyry was cut through, immediately beyond which ore was found, and, with this exception, the whole length of the tunnel is on the ledge. At about 175 feet in, the ledge is crosscut for 28 feet, all ore which will average $40 to the ton. In this is a streak of about six feet wide which runs on an average five and a half ounces gold to the ton. It is from this streak principally that the 275 tons shipped to Salt Lake since last spring have been taken. The excavation serves to show up the property all the more. This streak is about 75 feet long, and no ore has been taken out of it either above or below the tunnel level. It pitches westward into the Jim Crow ground.

The Jim Crow workings, while not as extensive as those of the Monitor, show up nearly as well. At the edge of the east line a shaft has been sunk 143 feet, all in low-grade ore. This was the first work done.

Yellow Pine District.

A THIRTY-THREE DAYS' RUN.—The gold mill at Keystone, Yellow Pine district, Lincoln county, produced $8000 worth of bullion—the result of a 33-day run.

ALASKA.

A NEW FIELD.—The officers of the steamer Topeka, just from Alaska, report there is considerable excitement at Juneau and Sitka, the result of a rich free-gold quartz find on Chekagoff island of the Aleutian archipelago. Despite the approach of winter many are flocking to the new gold camp.

ARIZONA.

A PECULIAR PROCESS.—Tombstone *Prospector*: The Copper Queen Co. will, in the course of a few months, have in operation works for the extraction of sulphur from the copper, which will be a revelation to many miners in this section. Instead of extracting the sulphur from the ore before smelting, as has been done with the ores coming from the lower levels of the mines at Bisbee, the sulphur will not be eliminated until after the ore has been smelted. The matte will be run through another furnace

which will turn out copper, which, though not wholly refined, will have eliminsted much of the hase substance contained in the metal.

To Be Reopened.—Since instructions were received to increase the force on the railroad hetween Prescott and Phœnix the water in the Congress mine, which has lain idle for two years, is heing pumped out, indicating that work will soon he resumed. The mine was closed to await the completion of the rosd, as the owners clsim they can save $150,000 a year in freight alone over wagon freighting.

Around Prescott.—Prescott *Courier*: In the Chaparral gold mining section, 20 miles sonth-east of Prescott, there are six mills of from 5 to 20 stamps each. There are also no less than 20 producing gold mines, the ores from which range in value from $10 to $300 per ton, and the ledges from ten inches to six feet in width. Within a few miles of these mines is a 250-ton concentrator, a revolving roaster, two 30-ton water-jacket smelting furnaces, thst are supplied by a two-mile-long 20-inch gauge railroad, which runs to the mines, which supply it with ore csrrying copper, gold and silver. Thirty-five miles east of Prescott is the great 300-ton copper smelting plant of the United Verde Copper Co., the ore from the mines carrying a high percentsge of gold snd silver, the hullion ontput heing two carlosds per day. In the Hassayampa district, near Prescott, there are some valuable gold properties, hut most of the mines carry a high percentsge of silver, which latter are of course more or less neglected for the more exclusively gold properties. In Wesver district, tributary to Prescott, there is a ten-stamp mill running on gold ores. This district is noted for its immense output of coarse and high-grade quality of placer gold, many unggets having heen found there ranging up into the hundreds of dollars each in value. In the Martinez gold mining district, 40 miles west of Prescott, is a 40-stamp mill on the Congress mine, which has heen worked to a depth of 1000 feet with all workings in good ore, and has produced $2,000,000. This mine has two ledges, which range from four feet to thirty feet in width.

No Men Needed at Bisbee.—*Prospector*: J. W. Howell came to Tombstone on the 25th from Bisbee, on his way to San Francisco, where he will remain a couple of months. Work at the Copper Qneen mine will run along as at present for an indefinite period. Mr. Howell states that 15 tramps walked into Bishee on the strength of a statement that the company wanted 1000 men. There are more good men in town now than the company can put to work for probably six months to come.

BRITISH COLUMBIA.

Dredger Diggings.—Nelson *Miner*: Some months ago it was announced that a Chicago company had been formed for the purpose of working some placer ground near Elk City by means of a floating dredge. E. L. Galvin of Chicago, who is the superintendent of the company, lately reported progress. The dredge has heen a complete success, handling the gravel in good shape and showing excellent returns.

It was rather late in the fall when the machine began work, and some six acres of ground were handled. The gravel ran from five to seven feet deep, and gave an average return of about $4000 psr acre.

The company is only stocked for $50,000, so that the experimental working will make an excellent showing on the books as a dividend on three months work all told.

COLORADO.

A Bio Boom.—Leadville Cor. Denver *Republican*: Information has just reached here from a reliable source that a boom of large-sized proportions has broken out in connection with Granite gold fields, located a short distance south of the city, the occasion being a rich strike of gold-hearing ore on the Aspen-Brown-Gillespie property. Traimen on the Midland report a crowd variously estimated from 500 to 1000 encamped in the neighborhood of Hartsel. The Granite field has attracted attention for some time on account of the strikes of the yellow metals made from time to time, notably in the Solix Tylec and other properties, hut it has been overshadowed by Cripple creek to such an extent that widespread publicity was not made. In the opinion of many the developments of this new territory will soon begin on a large scale.

The A. Y. and Minnie is shipping 50 tons a day, the reason given hy the mansgement for the size of the output being the amount of water in the mine, which prevents more extensive developments and which would require an amount to remove which the present price of silver does not justify. When the prospects of the white metal improve a heavy output will be the inevitable result, as there is an ore body in sight, the dimensions of which are impossible even to realize.

The Antioch, a gold producer in the Leadville district proper, is employing 30 men regularly and keeping up steady production. The Little Johnny, another gold producer, has been shipping 50 tons daily to the valley smelters and will largely increase its shipments. The Catalpa is also shipping regularly from 25 to 50 tons to the same source. In the Wolcott the new shaft is down 260 feet in wash and lakehed material. The intention is to drift from the new shaft into the old workings. What is known as the Elk fault has broken the formation near this point. The faulting lies between the Capital shaft, the latter having the porphyry and a portion of the lime has been eroded, but the lime has been replaced in places hy parting quartzite and iron and lead ores. This ore, it is supposed, is a portion of the great Maid chute, that, it has been demonstrated, is a westerly trend.

No marked improvements in the smelter situation has taken place. The Bimetallic is running three stacks to their full capacity, and the Elgin also is in active operation. The anticipation of the Arkansas Valley blowing in its ten furnaces is general, but is not yet a settled fact. It will, however, probsbly soon be decided. President A. R. Myers of Kansas City is now here looking over the situation.

IDAHO.

The Sonium Process.—Baker City *Democrat*: A representative of the Boise *Statesman* returned the first of the week from a trip of inspection to the new gold saving machine of the Portland Amalgamator and Mining Company, which was heing operated on Commissioner Paul's place near Parma. Operations now have been discontinued at that point for the winter after a few days run, owing to the freezing up of the small lateral from the Sebree ditch. Mr. Paul is arranging to start it up again on another bar, using a China pnmp to raise the necessary water from the Snake river.

It has long been a well established fact that sodium will so quicken the action of mercury as to amalgamate in considerable bnlk the precious metals upon the least contact almost instantaneously. Although hut a mere particle of sodinm was required to produce this result, yet the effect was short lived, and it necessitated constant application to keep the mercury active. All devices heretofore tried for applying sodium in the work of amalgamation have heen found imprscticahle until Nathan L. Rsher invented the Portland machine.

This mschine, viewed from in front, is an ordinsry looking stairway, or five-stepped terrace. A stream of water csrrying the sand and gold pours over these steps with speed and quantity regulated to the capacity of the machine. These steps, which in themselves are copper in amalgamating plates, are 56 inches long and ahout a foot in width, and inclined at ahout seven degrees to give the desired velocity to the water. In front of each plate, extending the entire length, is a trough filled with mercury. This trough is 2½ inches deep, hut in the new machines will be only half this depth, and is two inches wide. It requires from 30 to 50 pounds of mercury to charge a single trough. The mercnry fills the trough even full in some cases, and in others it is kept a half inch below the top.

The stream of sand and water fall perpendicularly on top of this body of mercnry with force sufficient to insure good contact, but not enough to flour or displace the mercury. This is regulated hy suspending the trough from one to two inches below the edge of the plate. The stream has force enough to concave the mercury a little, to wash over the edge of the trough all sand, and to keep the surface of the mercury cleared so that each drop of water, as it falls, is hronght into contact with the mercnry. It is calculated that the first trough catches 75 per cent of all the gold; the second saves nearly all the rest. The plates catch a little. The other three troughs are a reserve force and catch any mercury that may have been splashed over. From three to six tons an hour will psss one of these batteries with six or seven miner's inches of water.

The secret of the sensitized mercury is yet to be explained. In the hottom of each trough are fastened two porous cells of triangular shape, and each extending ahout half the length of the trough. These cells are hollow and are filled with any solution of which sodium is the hase. Common salt has heen found to be the hest for this purpose. This solution is decomposed with an electric current, and the molecules pass through the walls of the porons cells under the pressure generated. The two metals sodium and mercury, readily amalgamate, and the chlorine passes off as a gas. But even gas passing through a body of mercury will flour it. So the apex of triangular cell extends about a quarter of an inch at the back of the trough above the surface of the mercury. Then the gas, following the line of least resistance, escapes to the surface between the body of mercury and the porous cell.

This decomposed solution passing through the porous cell furnishes a constant supply of sodium that keeps the mercury so sensitized that it will amalgamate even iron pyrites passing over it. The effect of the sodium on the mercury is manifest in the heat that is generated, it heing possible to cause the mercury to hoil out of the trough. A one-horse power dynamo will supply light for ten machines.

The flow of water and sand, the inclination of the plates, the lowering of the tronghs below the plates, the lowering of the mercury in the troughs, the filling of the porous cells with the sodium solution, the regulating of the electric current to the desired number of amperes, the cleaning up of the amalgam, are all done with devices that render the operation of the machine very simple.

The company claim to save all the assay value of the sand or pulp. It is also claimed for the machine that it will supplant all other methods of amalgamation in quartz mills as it is the only method by which loss of a portion of the values can be avoided. In pyritic ore it will amalgamate the gold carried in the pulverized sulphides.

A Novel Scheme.—The search for gold is becoming as widespread as it wss before the discovery of the bonanza silver mines. One miner has recently anchored a hoat ou the bars of Snake river, in Idaho, for the purpose of ohtaining gold from the mud in the river. He provided a number of huckets attached to an endless chain, each hucket capable of holding about 20 pounds of dirt. These are fixed so that they will scoop up the sand and mud and deliver it to a hopper. A small engine suffices to supply motive power. The hopper is agitated hy the engine and a stream of water carries away the refuse. The gold is canght hy an application of quicksilver on copper plates. Three men are employed and about a hundred tons of gravel are handled daily. The work is hard and disagreeable, hut they do not mind that if they can continue to get gold out of the mud.

The Alsska-Treadwell mine, Douglas Island, has a 240-stamp mill. During the last fiscal year it crushed 257,255 tons of ore, yielding an average of $2.13 in free gold. They treated 4584 tons of snlphurets, giving an average of $41.28 per ton. The bullion sold hronght $694,659. The profits were $385,614, and the mine paid $375,000 in dividends.

A Rich Strike.—*Statesman*: A very rich strike has been made in the Homestake gold mine at Neal, a streak having heen opened that is from twenty inches to two feet thick and that runs ahout $500 per ton. K. P. Plowmsn, when sske sbout the strike, ssid he hsd not seen it yet. A teamster brought him the news with a request for sacks in which to ship the ore. The rich stresk, he said, was about 20 inches thick, and those at the mine gnessed the value all the way from $400 to $1000 per ton. This stresk was first met with in an upraise some time ago, where it appeared as a stringer diverging into the footwsll. Recently a cross-cut was started from the tunnel level to find the streak. This intersected the streak on Sunday, after having run seven feet. The discovery is msde about 75 feet from the surface.

A New Gold Saver.—Bntte *Miner*: A Boise, Idaho, man has invented a new device for ssving placer gold. The machine is marvelonsly simple in construction. It consists of a sluice box of ordinary size, into which are set in grooves copper amalgsmated screens. The screens, any number of which may he placed in the slnice, are arranged in sets of three, each set being a foot or such a matter apart. The counter screen of each set is placed in a vertical position and the other two are arranged at opposite angles of ahout 45 degrees each. These screens are placed in a slanting position in order to present a greater surface to the water. In the first set of screens the meshes are ahout 20 in number to the square inch. The meshes are made finer in each succeeding screen until in the last there are 40 to the square inch.

The dirt is first put through a grizzly or a series of grizzlies and the finer particles with the gold pass into the sluice hox and through the first set of screens. Here some of the gold is canght in the meshes of the amalgamated copper wire. As it goes on, passing through the finer and still finer screens, all the gold, so the inventor claims, is saved. In order to make a clean-up the screens are removed and the amalgam hrushed off, the same as in the case of amalgamated plates.

All the flour gold saving devices now in operation depend on their success upon the gold settling to the hottom of their sluices or rockers. The specific gravity of the flour gold is so infinitesimal it will not settle, hut will float along with the sand. The inventor says his patent overcomes that obstacle, it heing almost impossible for a particle of gold to pass through the series of screens without coming in contact with the amalgamated copper wires.

The inventor has given the machines several tests on Snake river with gratifying results, fire assays failing to hring to light any traces of gold in the tailings which before heing put through the machines were known to be thickly sprinkled with the yellow flour.

NEW MEXICO.

At Silver City.—*Enterprise*: The Pacific mill is running on Pacific ore, crushing 25 tons per day with the usual favorable results.

John Brockman's mill at Lone Mountain started up last Monday.

The Walker mill at Pinos Altos is completed and will he started next Monday.

The Manhattan Gold Mining Company paid their employes in full to November last. A full force is at work on the Aztec tunnel and the vein will be cut ere many feet are driven. The tunnel is now heyond the point at which the survey located the vein, hut a slight deviation in the dip of the lode would throw it several feet out of the line.

The Texas mine is keeping up its reputation as a producer. Drifting, stoping and sinking are in progress. A hig body of rich ore was struck this week. The vein is exceptionally large and is highly satisfactory.

Bill McAllister will build a custom mill on the No Hay Nada mine, the property which created such an excitement two years ago. As depth progresses the prospects continue favorable, and as McAllister is an old-time miner, it is presumed he knows what he is doing. He has purchased the old Carlisle mill and he is confident of making a success. The No Hay Nada when first struck was the wonder of the Southwest, large chispas of gold being encountered within a few inches of the surface.

A New Placer District.—*Record*: Within a stone's throw of the town of Dolores, South Santa Fe county, here has heen unearthed a new placer district where 125 men are now at work, some of them clearing up $20 a day in nugget gold. At this point hedrock curls up to within from three to ten feet of the surface and the top earth is stripped off, revealing the gold in quantities well calculated to create a furore.

A nngget worth $4 was found on Tuesday, and on Wednesday a shiny hit worth $2.50 was taken out. Mr. Wilson showed several nuggets worth prohably 25 to 75 cents each.

There are some thirty of those fanning machines known as dry washers and worked by hand power in the new district, and they are doing well. Ahout one-half of the men engsged there are natives. Day hefore yesterday a thrifty fellow crawled out of a hole with two huckets full of sand and gravel and he offered them to a Colorado miner who stood near for $10. The Coloradoan laughed at the Mexican, and the Mexican then put these two buckets full of stuff through his little fanning machine and scraped out full $20 worth of gold dust and nuggets.

UTAH.

A Lively Camp.—Sslt Lake *Herald*: Among yesterday's arrivals from Mercur, Utah's great gold camp, was E. B. Shorthridge, who is in the city sgain for the purpose of negotiating another sale of mining properties. "The excitement is growing daily," he stated to a *Herald* msn, "and the rush to the csmp still continues without abatement. Every stage which enters the csmp is losded with capitalists anxious to get into the swim. They are mostly from Colorado, which State is unloading a great number of men ou to us. As a general rnle they have money to invest and are getting hold of some of the best properties in the camp. On Saturdsy over $100,000 changed hands as the resnlt of leases, bonds and ssles. The Glencoe people are already at work putting up their mill, and all the mines are incressing their forces. The csmp is all activity and is growing with remarkable speed. Many new buildings are going up and preparations are being made for the esrly erection of more. Several cars of lnmber were on the siding waiting to be unloaded when I came down. We have three inches of snow at Mercur, but it does not in the least hinder operations, which csn be continued all winter without interruption. There is a good opening at the csmp for a live assayer who is not afraid of roughing it with the rest. As an example of the manner in which some of us are living, the instsnce of 13 Colorado and Utah capitalists sleeping in a shanty with the snow drifting over them might he cited. Mr. Shoebridge was successful in his deal, and will leave for Mercur this morning."

WASHINGTON.

Notes.—Okanagon *Outlook*: The south drift in the upper level of the Columhus mine is in a fine body of ore. It is said to he fully as rich as any yet taken out of this mine and several tons are being sacked for shipment to the Tacoma smelter.

Chas. Siehert visited the seat of placer mining opsrations on the Similikameen this week, and found everything in a favorable condition. The hoys are still working their sluices and rockers and will continue as long as the weather will permit.

The quartz mill at Oro is running on ore from the famous Allison gold mine on the Similikameen, and most flattering results are reported.

S. J. Sincock, who has heen working on a mining claim up at the head of Toats Coula creek for the past six weeks, returned home yesterday. He brought down about 50 pounds of ore as a sample of the vein, which is six feet wide and all mineralized. Mr. Sincock is highly pleased with the showing made and will have the ore tested. The claim lies in an unexplored district about 16 miles northwest of Conconully, and Mr. Sincock is of the opinion that the lead is but the extension of some of the many large veins running through this camp. The character of the ore is similar and the vein runs in the same direction, varying a little west of north.

John Siehert & Hank Deihl returned yesterday from the Similikameen, where they have been placer mining for the past four months. They have built ahont 900 feet of a wing dam and had just began washing out the gold when a snow storm came on and they were forced to ahandon it for the season. They have everything in good shape, however, and as soon as spring opens will renew operations. The boys are thoroughly convinced that the bar contains gold in paying quantities, and brought down several ounces of the "stuff" to convince the skeptical. It is all coarse gold and many of the particles were as large as pess.

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Bluffkins was sitting in the club-room not many evenings since, when Blake entered and took a seat near the fire.

"I say, Bluffkins, Blake began, "who is that new party Webb tells me arrived at your house yesterday?"

"Birthday party," replied Bluffkins, disconsolately.

"Don't talk nonsense," said Blake, savagely.

Bluffkins looked up in surprise. "I'm not talking nonsense, old man. Never was more serious in all my life. It's the stern truth; it weighs ten pounds, and it's a boy."

Market Reports.

The Markets.

SAN FRANCISCO, Dec. 7, 1893.

The only notable fact in the silver market during the week was an advance yesterday in Loodon and New York. The statement of prices for yesterday and the day previous is as follows:

Silver—	5th.	6th.
London. pence, ℔ oz., 925 fine.	31 15-16d	32 1-16d
New York, ℔ oz., 1000 fine.....	69¼c	*69⅝c

*Thirty days, 67¾c.

San Francisco Metal and Coal Market.

ANTIMONY.			QUICKSILVER.		
Per ℔	—	@ 13	Home trade, pr. flask	40 50	@41 00
BORAX.			STEEL.		
Refined, in car lots	—	@ 7¾	English, ℔	—	@ 18
Powdered, do...	—	@ 7¾	Canton tool...	—	@ 8¼
Concentrat'd, do	—	@ 6¾	Sil'k Diam'd tool	8¾	@ 15
All grades jobbing at advance.			Pick & Hammer.	9¢	@ 10
COPPER.			Machinery.....	4	@ 5
Bolt.....	23	@ —	Toe Calk.....	—	@ 4½
Sheathing.....	23	@ —	PIG TIN.		
Ingot, jobbing..	—	@ 20	Spot ℔ ℔...	21¾	@ 22
Do, wholesale	15	@ 16	COAL.		
IRON.			SPOT FROM YARD—PER TON.		
Bar, base.....	—	@ 2½	Wellington	$8 00	
Norway, base...	—	@ 4½	Greta	7 50	
PIG IRON.			Nanaimo	6 50	
	Spot.		Gilman	6 00	
Eglinton ℔ ton...	—@—		Seattle	6 50	
Glengarnock.....	27 00@	—	Coos Bay	5 50	
Am. Soft, No. 1..	25 00@	—	Cannel	9 00	
Shotts No 1.....	27 00@	—	Egg, hard	12 00	
Puget Sound.....	—@—		Wallsend	7 25	
Clay Lane White..	30 00@	—	Scotch Splint	8 00	
Langloan	27 00@	—	Brynbo	7 50	
Gartsherrie	27 00@	—	West Hartley	7 50	
Barrow	—@—		TO LOAD—PER TON.		
Cargofleet	—@—		Australian	6 50@	—
LEAD.			Liverpool Steam	6 87@	—
Pig	—@	4½	Scotch Splint	7 00@	—
Bar	—@	5	Cardiff	7 00@	—
Sheet	—@	6	Lehigh Lump	10 00@	—
Pipe	—@	5½	Cumberland	8 50@	—
SHOT.			Egg, hard	9 00@	—
Drop, sizes *smaller* than B, ℔ bag of 25 lbs		$1 75	West Hartley	7 50@	—
Do do, B and *larger* sizes ℔ bag of 25 lbs		2 00	COKE.		
Buck, Ballsand Chilled do, ℔ bag of 25 lbs		2 00	English, to load	$9 50@	10 00
			Do, spot, in bulk	—@	12 00
			Oo, in sacks	—@	14 00
			Cumberland	9 50@	—

Mining Share Market.

SAN FRANCISCO, Dec. 7, 1893.

There was a retrogression in Comstock shares in the earlier part of the week, followed by an effort at a slight advaoce later, the amount of business being mostly local. Prices closed a little under the quotations of the previous week.

The meeting between the directors of the Con. California and Virginia Mining Company and Mr. Rule resulted in a mutual agreement as to the form of contract under which he does the work on the 1000-foot level of the old Con. Virginia shaft. The contract is for six months from December 1, 1893. Mr. Rule is to get ten per cent of the net profits of all ore fouod under the workings of the contract, the sum received by him not to exceed $10,000.

Assessments delinquent this month aggregate $161,920; of this amount Nevada mines claim $136,920.

The following mining companies had cash on hand Dec. 1st, as follows:

Alpha, $4711.71; Alta, $3488.45; Andes, $2231.72; Best & Beclher, $6441.91; Bullion, $9953.18; Caledonia, $8149.08; Confidence, $1439.31; Chollar, $4821.57; Con. New York, $4875.69; Con. Cal. & Virginia, $52,657.29; Challenge, $2079.16; Crown Point, $7296.75; Con. Imperial, $1261.73; Gould & Curry, $8592.51; Hale & Norcross, $24,265.87; Justice, $1498.35; Julia, $3206.05; Kentuck, $1498.38; Lady Washington, $1683.74; Mexican, $9339.03; Nevada Queen, $1792.86; Occidental, $596.75; Potosi, $4297.96; Syndicate, $1205.40; Sierra Nevada, $12,518.27; Silver Hill, $885 07; Utah, $2743.23; Union, $20,654; Union Con, $26,754.58.

Of the $24,265.87 of the Hale & Norcross reported above, $21,100.95 was acquired from public sales of stock in the company's treasury, forfeited for non-payment of the recent assessment.

During November the Comstock Milling and Mining Company paid out for labor $61,439 50. This is $3489.75 more than was similarly paid out in October.

Board Sales of Mining Stooks.

S. F. Stock Board.

WEDNESDAY, December 7, 1893.

9:30 A. M. SESSION.

400 Alta	15c	700	80c
200 Andes	65c	200 Mexican	1.15
150	60c	200	1.20
350 Belcher	80c	350 Savage	75c
450 B & B	2.50	100 Ophir	1.70
100 Bullion	35c	550	1.75
400 Bulwer	10c	100 Overman	35c
200 Challenge	70c	200	30c
300 Chollar	60c	100 Potosi	70c
350 Con. Cal. & Va	3.70	300	65c
100 Confidence	1.65	500 Sierra Nevada	1.40
200 Crown Point	75c	50 Union	1.10
360 G & C	1.20	800 Yellow Jacket	1.20
100 H & N	65c		

2:30 P. M. SESSION.

150 Best & Belcher	2.50	100 Ophir	1.80
100 Chollar	60c	100 Overman	35c
550 Con. Cal. & Va	3.75	100 Potosi	75c
250 Crown Point	75c	200 Savage	75c
700 H & N	85c	150 S Nev	1.45
100 Iowa	5c	850 S Louis	20c
100 Mexican	1.20	200 Y Jacket	1.20

Complimentary Samples.

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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING NOV. 21, 1893.

508,906.—STALK CUTTER—W. Allingham, El Cajon, Cal.
509,013.—DOOR MAT—S. Armstrong, Lind, Wash.
509,117.—PAVING MACHINE—R. J. Carson, S. F.
508,920.—PIPE WRENCH—L. Dahlstrom, Santa Clara, Cal.
509,156.—STAMP MOISTENER—H. A. Fry, S. F.
509,077.—SEAL LOCK—F. E. Gstze, Los Angeles, Cal.
509,078.—CURTAIN FIXTURE—C E. Goodrich, Pioche, Nev.
509,161.—CURTAIN FIXTURE—C E. Goodrich, Pioche, Nev.
509,030.—FILE—H. Haustsin, S. F.
509,082.—HARVESTER—J. L. Ifeald, S. F.
509,310.—GAME—W. W. Lapham, S. F.
509,041.—CHUTE—Loyd & Relersen, Tacoma, Wash.
508,961.—COUNTER SEAT—Gen. A. Moss, S F.
509,325.—CAR—T E. Pope, S. F.
509,096.—CALIPERS—C. W. Preston, S. F.
509,274.—STRINGING PIANOS—C. S. Wsbor, San Jose, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

LACE, VEILINO OR RIBBON HOLDAA.—Julius M. Schlesinger, San Jose, Cal. No. 509,691. Dated Nov. 28, 1893. The object of this invention is to provide a convenient device for holding and displaying laces, veiling, ribbon and other similar delicate goods, so that they can be easily displayed and inspected. It consists essentially of a hase or hsses having cylindrical posts at their opposite ends, and thin, flat bolders upon which the material is wonod, having tnbnlar end posts corresponding with those upon the bases and adapted to slip over soch posts or be easily removed therefrom. It also consists of a means for rotating these bolders so that the material may be easily coiled thereon.

FOLDING CHAIR.—George F. Hanson, San Francisco, Cal. No. 509,735. Dated, Nov. 28, 1893. The advantages of this chair are that it is light, yet strong and dnrable, and can easily be folded into small compass for convenient transportation, and as easily expanded for nse, as occasion may reqnire. The chair is composed of a back piece having legs, a second pair of forwardly inclined npwardly divergent legs pivoted near their lower ends to the legs of the back, and a third pair of backwardly inclined nowardwardly divergent legs pivoted to the divergent legs, a sliding hinge connection between the npper ends of the backwardly inclined legs and the back piece, and a suitable seat supported from the npper ends of the four inclined legs.

MITAA-BOX.—Martin Hanson, San Francisco, Cal. No. 509,736. Dated Nov. 28, 1893. This invention relates to what are known as miter-boxes, which are nsed for sawing lnmber at various angles for the jointing of fine and accnrate work. It consists of a horizontal table having a vertical back, a swinging lever fulcrnmed in line with the rear edge of the table adapted to tnrn about said fulcrnm pin so as to change the aogle of the cnt to any desired degree, a spring-actuated locking pin to hold the lever, and a lever by which it is disengsged when desired, saw gnides snpported upon the rear and front ends respeclively of the swinging bar to retain the saw in a vertical position while being nsed. These saw gnides consist of metallic enclosing snpports having replaceable wooden blocks fitted within the snpports so that the surfaces of the wood serve as a gnide for the saw and prevent injnry to its teeth. Snitable locking screws are employed to secnre the blocks in place, and allow them to be easily removed, when necessary, and the tops of the metallic snpports are also covered with wooden blocks to prevent injnry to the sawteeth when the latter is bsing introdnced or removed.

FEADING DEVICE FOR RIVETINO MACHINAS.—Hermann Hahn, San Francisco, Cal. No. 509,732. Dated Nov. 28, 1893. The object of this invention is to provide a means whereby tnbular and other rivets may be fed with regnlarity from a containing box to the point where the rivets are to he nsed. It consists of a tilting box or receptacle for the rivets having a longitndinal slot or opening in the bottom, into which the shanks or legs of the rivets are adapted to fall by reason of the oscillations of the box. The raceway is made with inclined snrfaces having npwardly projecting shonlders at intervals, presente l toward the front of the box, and a plate, the upper edge of which projects into the slot in the bottom of the box, so that the rivets fall npon it with the legs astride of this edge. This npper edge is provided with notches corresponding with the shonlders npon the raceway in the box, and these notches serve as stops to prevent the rivets moving toward the rear of the box, while allowing them to move freely toward the front, so that, as the box is oscillated or tilted ahont its point of snpport, the rivets are gradnally moved forward and delivered from the box to the carrier over which they pass to the point where they are to he nsed.

A FIND ON CAMP CREEK.—Phœnix *Gazette*: A valnable gold discovery has been made about two and a half miles northwest of Mrs. Marlar's place on Camp creek by Messrs. O'Leary & McCav. The ledge is two fest or more in width and very rich. The men are experienced miners, and they believe the prospect the very best for a paying mine. The ore assays $1500 to the ton.

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ASSESSMENTS.

COMPANY AND LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T AND SALE.	SECRETARY.
Alta S M Co, Nevada	44	10c	Nov 10,	Jan 4, Jan 23	J E Jacobus, 309 Montgomery
Belcher S M Co, Nevada	47	20c	Nov 3,	Dec 7, Dec 28	C L Perkins, Mills Building
Best & Belcher M Co, Nev	55	25c	Nov 1,	Dec 5, Dec 22	L Osborn, Nevada Block
El Leopoldo G & S M Co, Mexico	4	1o	Oct 26,	Dec 1, Dec 18	Jahez Howes, 214 Pine
Gray Eagle M Co, Cal	34	5c	Oct 11,	Nov 28, Dec 19	Chas C Harvey, 309 Montgomery
Jack Rabbit M & M Co, Cal	5	3c	Nov 1,	Dec 2, Dec 22	Chas Wetzel, 320 Sansome
Julia Cons M Co, Nevada	25	5c	Oct 23,	Nov 23, Dec 19	J Stadtfeld, 309 Montgomery
La Grange Ditch & Hy M Co, Cal	9	25c	Nov 10,	Dec 18, Jan 8	A Halsey, 328 Montgomery
Martin White M Co, Nevada	29	25c	Aug 31,	Oct 26, Dec 14	K L Ross, 120 Sutter
Overman S M Co, Nevada	69	10c	Nov 10,	Dec 14, Jan 4	Geo D Edwards, 414 California
Potosi M Co, Nevada	40	25c	Nov 13,	Dec 15, Jan 4	Chas E Elliot, 309 Montgomery
Savage M Co, Nevada	32	25c	Dec 2,	Jan 4, Jan 24	E B Holmes, Nevada Block
Teresa Mining Co, Mexico	12	10c	Oct 27,	Dec 7, Dec 23	K J Willats, Flood B'l'd'g
Yellow Jacket S M Co, Nev	56	25c	Nov 16,	Dec 21, Jan 27	W H Blauvelt, Mills Bldg

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE
Andes S M Co, Nevada		J W Twigge, Nevada Block	Dec 18
Head Center & Tranquility M Co	Annual	J W Pew, 310 Pine	Dec 12
Monnt Diablo M & M Co		R W Heath, 318 Pine	Dec 18

Cal. Debris Commission Notices.

NOTICE—THE CALIFORNIA DEBBIS COMMISSION having received petitions to mine by the hydraulic process from John Spaulding, in the Polar Star mine near Dutch Flat, and to deposit tailings behind a dam in Little Bear River; from Nathan Gardner in the Red Hill mine near Ono, Shasta Co., and deposit tailings behind dams in Wash Pan Gulch; from A. Denmire, in the Denmire mine near Gold Lake, Sierra Co., to deposit tailings in an old hydraulic pit, gives notice that a meeting will be held at the office of the Commission, room 32, Flood Building, San Francisco, on December 12th, 1893, at 1:30 P. M. On or before this hour and date all parties interested may file affidavits, plans and maps, in support of their respective claims. By order of the Commission. W. H. Heuer, Corps of Engineers, U. S. A., Secretary of the Commission.

Assessment Notices.

CO-OPERATIVE PRINTING CO., 408 Sacramento St., S. F., Cal.

Notice is hereby given that at a meeting of the Directors, held on the 22d of November, 1893, an assessment of $2 per share was levied upon the capital stock of the Corporation, payable at the office of the company, to the Secretary, on the 22d day of December, 1893.

Any stock upon which this assessment shall remain unpaid on the 22d day of December, 1893, will be delinquent and advertised for sale at public suction, and unless payment is made before will be sold Monday, the 8th day of January, 1894, at the office of the company, at 1 o'clock P. M. of said date, to pay the delinquent assesement, together with the cost of advertising and expenees of sale.

MORGAN BACKUS, Secretary.

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Table of Contents.

The following brief abstract of the contents will give an idea of the branches of the subject treated:

General Plan; Discussion of the Principles of Hydraulics; Rules Deduced from Formulæ Obtained; Examples and Calculations; Extensive Tables for Ready Reference; Fundamental Laws of Hydraulics Demonstrated and Expressed in Formulæ and Rules; Flow of Water through Openings; Weir Coefficients; Triangular Weirs; Flow of Water Over Quadrant Weir (tabulated); Application of Tables; Submerged Orifices; Flow Through Orifices in Thin Partitions; Tables and Applications; Miners' Inches; Tables and Calculations; Flow of Water Through Short Tubes and Compound Tubes; Flow of Water Through Pipes; Tables of Velocities and Cubic Feet Flows for Given Fall per Mile and Diameter of Pipe; Coefficient for Bend—Circular and Angular; Flow Through Nozzles; Inverted Siphons; Flow of Water in Open Channels; Extensive Tables; Rough and Ready Notes; Hints for Speedy and Approximate Estimates, etc.

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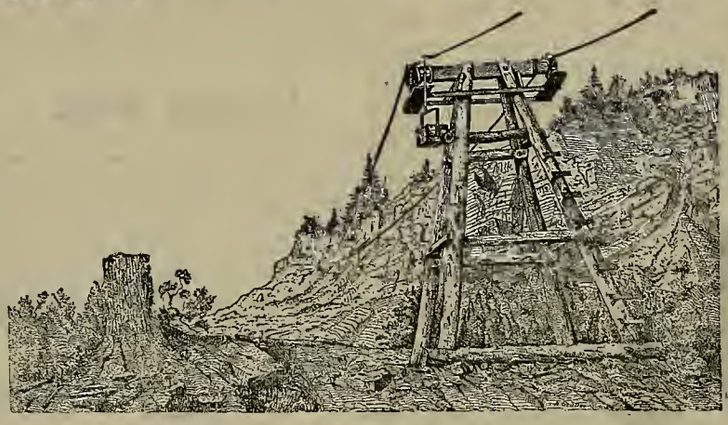

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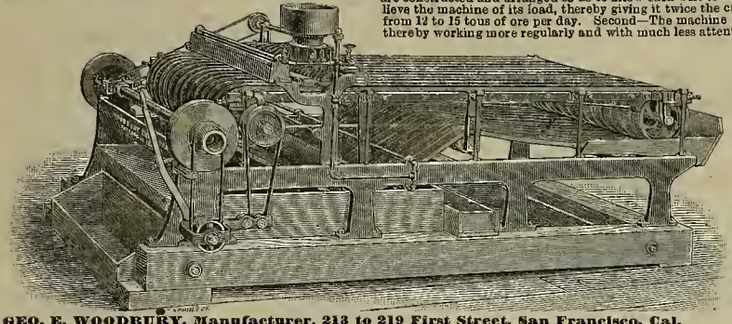

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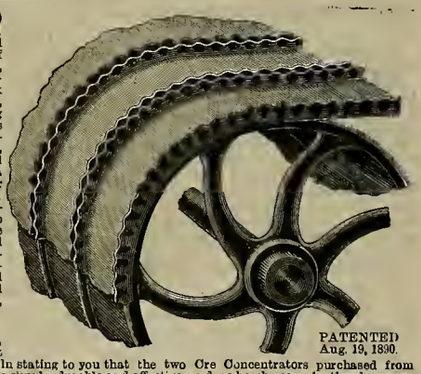

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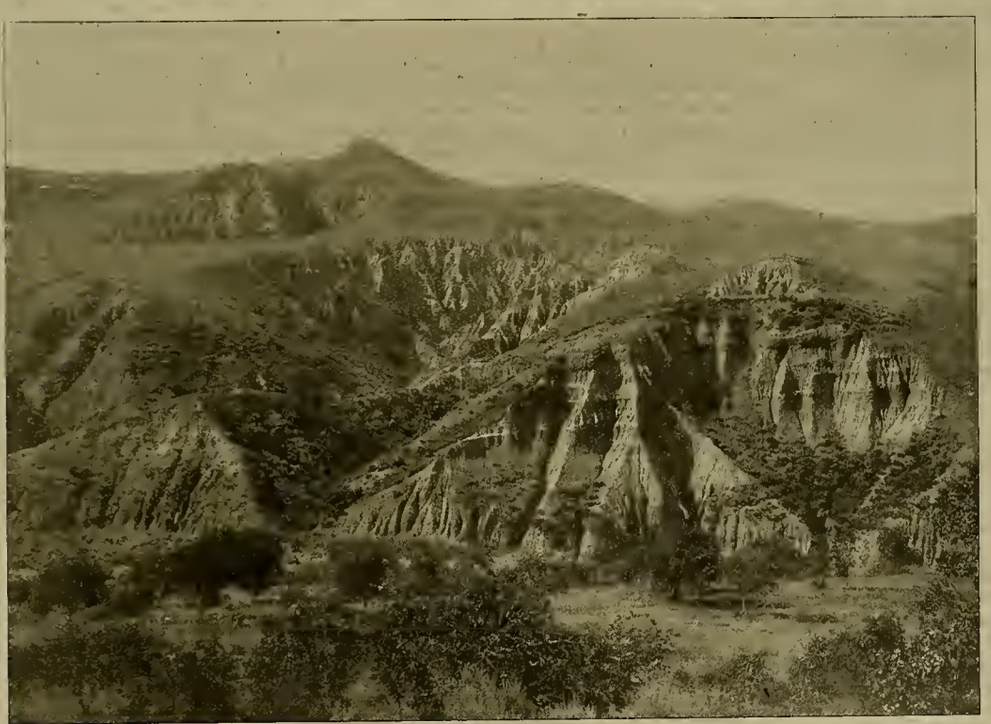
CALIFORNIA

Gravel Cliffs Above Tres Pinos.

Prof. Andrew C. Lawson of the Department of Geology, University of California, is author of a valuable bulletin, just issued, on the "Post-Pliocene Diastrophism of the Coast of Southern California," in which he seeks to establish two things as of great moment in the geological history of California, viz: 1. The uplift or emergence from the ssa of the entire coast of California from San Francisco to San Diego, in post-Pliocene time, to an extent of from 800 to 1500 feet, a very notable epeirogenic event. 2. The local deformation or differential movement of the crust to a very remarkable degree, particularly in the vicinity of Santa Catalina island and near the city of San Francisco, very notahle orogenic events, also of post-Pliocene age. The professor's conclusions are brought about by local excursions along the coast and in the interior. Among other sufficient evidences, Prof. Lawson finds that tbe river valleys fully confirm the conception of the general uplift of the coast. The more important valleys are the Santa Clara-San Bsnito, tbe Salinas-Santa Maria and the Santa Clara of the soutb. Three valleys—the Bay of San Francisco, the Santa Clara and the San Benito—form a single topographic feature, which may be known as the Santa Clara - San Benito valley. Its total length from the Golden Gate southwestward may be placed at 150 miles. The hreadth of its bottom varies from that of a headwater gorge to about 17 miles at the Bay of San Francisco. It has a remarkably straigbt course for its entire length. This valley is occupied by a trenched and terraced Pliocene delta. This fact is not so apparent at the middle of the Santa Clara portion of the valley as it is at its lower and upper portions. The lower portion is partially occupied by the Merced series. The upper portion, from the Pajaro canyon southeastward, reveals the delta in a great volume of approximately horizontal gravels. The Pliocene age is established by their unconformable relation to the upturned Miocene of Pajaro canyon, and by the fact that they contain pebbles of the white, siliceous shale which characterizss the Miocene of the coast. These gravels are exposed on the San Benito, the Tres Pinos and Los Meritos in a series of very remarkable cliffs, often over 1000 feet high, which are being developed by a vigorous sort of sculpture which yields the effects of a "bad land" topography, as shown in the illustration. The trenching and terracing action of the streams, as they have by stages dissected the delta during the progress of the uplift, has left remnants of it in the form of isolated hills and plateaus in the middle of the valley. The hedding is either horizontal or is tilted to the eastward at angles up to perhaps 15°. The altitude of the summit of a gravel plateau was made the subject of careful measurement. By the use of the mercurial harometer the summit was found to be 929 feet above Tres Pinos station. The latter is given in the railway levels at 514 feet above sea level. The summit of the plateau is thus 1443 feet above sea level. It is clear, from the character of the ground, that the summit of the plateau is not the original summit of the delta formation; much has been removed by erosion. Farther up the valley, also, these same gravels are known to the writer to be several hundred feet higher than on the plateau near Tres Pinos. The summit and slopes of the plateau are distinctly terraced at varions levels.

In these facts we have all the evidence that could be desired for the conclusive demonstration of (1) the depression of the coast in Pliocene time during the accumulation of the gravels; (2) the great volume of the Pliocene strata, certainly not less thau 1200 feet; (3) the correlation of the San Bsnito gravels with the Merced series at the lower end of the same valley; (4) the uplift of the valley with its load of gravel, in post-Pliocene time, to an extent uot less than the measure of the altitude of the plateau near Tres Pinos.



GRAVEL CLIFFS OF SANTA CLARA-SAN BENITO VALLEY, ABOVE TRES PINOS.

THE cyanide plant of the Gold Recovery Company is just ready for operation in the Black Hills district. The Deadwood *Pioneer* says: "The completion and opsration of this plant has heen looked forward to hy every one in the Hills, especially mining men, as the solvsr of the problem of treating our low-grade ores, not to be handled by chlorination, smelting or other high-priced processes, at a profit. In the cyanide process the owners of developed mines of low grade see where they can haul their ore, which prohahly would not average $12 per ton, and have it treated at a cost which would leave them a margin with which to live and operate their mines. The successful operation of this plant will increase the mining industry four fold in the Hills within three months after it has demonstrated its practicability to handle our low-grade ores to a profit. It would cause mine after mine containing large bodies of ore, ranging in value from $10 to $16, to be opened up and worked continuously, causing the employment of many men and giving the mining industry a healthy impetus and creating a market for all properties having a vein of mineral. Upon the success of the cyanide process depends in a measure the prosperity of the Hills."

FOLLOWING is from the London *Mining World* of recent date: "Tbe position of the Golden Gate Company may be summed up in a few words. It cannot, from circumstances explained at the meeting of stockholders, use the Feather river at present, but Col. McLaughlin suggests that a valuable ledge called, let us hope by prophetic instinct, Lucky Boh, should be explored, which he has no doubt will lead to profitable results. Mr. Borwick, who has now joined the board, when on the spot examined this ledge, and arrived at the same conclusion as the Colonel had previously done. They are both of opinion that it is better to do this than to do nothing; and when the shareholders heard the explanations that were given they were of the same opinion, and decided upon reconstructing for the purpose of finding the necessary funds. This is the whole nosition, and it is changed from what it was only in this respect, that while by no means abandoning the attempt to work the river bed, the company will enter upon quartz-mining operations which, so far as we can ses, are likely to give increased value to the shares and dividends to the shareholders. A shareholder in the meeting expressed some want of confidence in Col. McLaughlin, but Mr. Pechey, speaking on behalf of the board, stated most emphatically that in this gentleman neither he nor his colleagues had lost one atom of faith. They helieve that circumstances have hsen against him, but that the time is coming when he will prove the accuracy of his statements by the gold he will produce. That is the opinion of the board, and it is ours."

THE Idaho-Maryland mine at Grass Valley has inaugurated a novel method to assist in the disposition of its waste. The available dumping ground had bsen ntilized, and the notion of a hydrsulic elevator, to raise the ore cars to a tramway built over the dump, was conceived and carried out. The framework of the elevator is of heavy lumher, anchored to a concrete foundation. The platform has a lift of 30 feet. The ram is 6½ inches in diameter, and is raised under the natural head of water—530 feet—supplied to the mill. The elevator is supplied with a two-inch pipe, hut it was found necessary to decrease the speed by reducing the opening to five-eighths of an inch. The elevator is controlled hy a simple lever and stops automatically at both the upper and lower landings. Its capacity is three tons.

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It is safe to say that the proposed new tariff has more direct effect upon the industries of the country than any proposed since the Morrill tarriff of 1861; and yet, curious to note, the industrial interests of the nation, which have always been exceedingly sensitive to legislation and clamorous against reduction of tariff duties, are now inactive and almost silent. The fruit interest of California is vitally concerned, but it has been unable to raise money to send a representative to Washington in its own behalf. The mineral industry of all parts of the nation is affected, but it has done nothing. The lead-silver mines will be brought into direct and unrestricted competition with those of British Columbia, it is pretty generally believed among miners to the further injury of the industry. The duty on copper is to be removed, and the mines of Montana and Arizona affected, but they do not appear to view the prospect with alarm. California has comparatively little direct interest in these things, but it has in quicksilver, of which it is a large producer, and from which the duty is altogether to be removed. And so the list might be extended at considerable length. Scarcely a voice is raised in protest. The reason seems to be that the party in power is bound to enact a new tariff, and objection will be useless; and there is a sort of negative assent on all sides that the experiment may be tried, so that a demonstration of the workings of a low tariff may be given.

It is said that the coal-fields of Mendocino county are to be developed by Messrs. Flood and Mackay, the owners. The fields are very extensive, and adjoin the coal properties of the Navarro Mill Company, about 40 miles from Ukiah. The exact nature and extent of this property are not matters of general knowledge, but they are said to be such that their development is fully warranted. It goes almost without saying that any field in California which can produce coal in commercial quantities will be a property f immense profit. Almost the whole coal supply of San Francisco comes from the mines of Puget Sound, British Columbia and Australia, and importations from Japan on a large scale have just begun. Henry Villard, organizer and chief promoter of the Oregon Improvement Company, which is owner of several important coal mines near Seattle, once claimed, in an official report, that a fair profit could he realized at Seattle with coal at $2.50 per ton. The cost of haudling and transportation to San Francisco is about $2 more. The average price at the yard in this city for the past year has heen $6.50, leaving an apparent profit of at least $2 per ton. It is evident from these figures, which represent the lowest prices received in this market for any coal (with one exception), that a fine opportunity exists in California for a local coal mine of sufficient extent and average quality of output. The situation has long been perfectly well realized. The difficulty has been to find the coal-field.

The Debris Commission's Report.

The official report of California Debris Commission, from which copious extracts were made in last week's issue of this paper, indicates a state of things that ought to afford a degree of satisfaction to the hydraulic mining industry. The Commission was appointed for the purpose of bringing about a revival of hydraulic mining, if practicable and if compatible with other interests; and it is evident that its members have a clear understanding of their duties and their obligations to the public, particularly to the miners. The report fairly points out the obstacles in the way of resumption by certain classes of mines; and as fairly shows how resumption may be brought about by others.

The chief problem to be solved is, of course, the matter of storage of debris; and the Commission divides the various sites into three, viz: (1) reservoirs in worked-out hydraulic pits; (2) natural sites; and (3) sites in the beds of natural streams. The two first are naturally to be preferred, for they do not involve the filling of streams by detritus, which is the point of controversy. The Commission points out the danger that may arise in extreme cases from the latter method, but really expresses no direct opinion as to whether or not they are to be adopted or avoided. From the general trend of the report, however, the following may be fairly deduced:

Where a natural site or an old hydraulic pit are available for storage they are by all means to be preferred; and, where not, the cases must be determined upon their merits and their separate conditions. Restraining works erected in natural water courses must be made more durable than in dry gulches, or in natural sites, for the obvious reason that they are more likely to give way. If built of wood, they are sure to decay in a few years, and the debris carried off. Permanent restraining works must therefore be erected in such cases, if at all

These things constitute a virtual announcement of a broad rule of conduct for the Commission in determining applications to mine, and they will serve as a partial guide for owners of mines in deciding whether license is likely to be granted. It has been pretty generally understood all along that the only mines about which there would be serious question belong to the third class; and no surprise need be felt at the attitude of the Commission. Its reasons for its position are easily discoverable. It must be remembered that the so-called valley interests have exactly the same recourse—viz., the courts—they had before the passage of the Caminetti Act. The Commission is as fully controlled by the Sawyer and Gilbert decisions as are the miners themselves. The Caminetti Act is not a repeal of the findings of the courts. It is simply a device by which they may be applied for the benefit of the miners. The Commission is hound, therefore, to have always in full view the former action of the courts, as well as the probable action of the same tribunals in case their intervention is demanded.

It is again worthy of comment that no application to mine has as yet been denied by the Commission. About twelve have been granted, and no doubt similar action will be taken in other cases now under consideration. It doub less seems to many that progress has heen slow, but no one acquainted with the situation ever expected that, with the appointment of the Commission, hydraulic mining would spring once more into being, as sturdy and active as when it was killed in 1884. The process must be gradual. On the one hand, it has been necessary for the Commission to determine its own method of operations and to interpret and apply a new and untried law; on the other, the miners have been anxious to learn the attitude of the Commission and the probable scope and effect of the law. The Caminetti Act was an experiment whose practical adaptation to conditions in California must be learned. These things have now been determined in a fairly satisfactory manner, and the way to resume hydraulic mining is clearer than it was before. We may reasonably expect that more will be accomplished in 1894 than during the present year.

The sequel to the riots in the Cœur d'Alene mines a year ago last spring is found in a judgment hy an Idaho court for $11,500 damages, given against the Helena and Frisco mining companies and in favor of Chas. J. Patterson. Patterson was a non-union employe. He was hired about a week before the mill was blown up and claimed that he knew nothing about the danger. While in bed in the new mill a rifle ball cut his ear off, and when he escaped from the mill he was severely beaten. There are over 100 damage suits of this character, hut it was impossible to try them at this term of court. The mining and milling companies have sued Shoshone county for damage to their property, which is an exceedingly large sum and may reach a half million dollars, and they will also endeavor to collect all the damage they sustain by lawsuits because the county did not protect their property.

Needed Changes in Mining Law.

Written for the MINING AND SCIENTIFIC PRESS by M. C. Ihlseng, E. M., C. E., Ph. D., Prof. of Mining Engineering and Assaying, Pennsylvania State College.

I am very glad to see the efforts making to bring about necessary changes in the present mining law. That the condition of the same is chaotic, if not positively unjust, must be conceded hy all who have had any experience with its operation. If I may be permitted to transgress upon your time, I would like to add a few words in the hope that the modifications already so ably argued in your columns may be supplemented by the points I herein offer as simplifying the present conditions of maintaining title

One feature of the law which might be altered with benefit to the prospector and miner concerns the matter and manner of record and identification of the lode claim. It is now incumbent upon all locators to define the boundaries of their claims hy placing stakes at the corners to notify all comers that the enclosed portions of the public domain are entered upon and claimed for mining. The law does not explicitly require their maintenance and if the action of the elements have obliterated these landmarks, there remains no notice to prospectors that the certain ground is appropriated. If a prospector finds a good outcrop and mineral and wishes to locate thereon, he has no warning whatsoever, if the atakes are absent, unless he explored minutely the adjacent territory for a radius of 1500 feet. We all know what a task that would be in slide rock or wooded regions. If he shonld go to the county records nothing there would help him, for the claims are described so indefinitely that the vague outlines and location might apply anywhere. If, after spending considerable time and money in developing his "find," he is notified of trespass, the fact that he has remained for years in undisturbed possession of the ground is of no avail. The original locator obtains the advantage of all such work unwittingly performed, notwithstanding that he has failed to keep up the required stakes.

Again, as to the effect upon one who, in making application for patent, finds himself in trouble because of the contention that he neglected to maintain stakes or had never placed them. Such a fact proven might constitute, and often does, an argument that he had originally intended to locate his claim in a different direction from that now being sought for patent. This suggestion might he elaborated upon in its many phases, but these ought to suffice.

From the frequency of such occurrences, it would seem that Section 2400, requiring the location certificate to contain such a description of the claim as shall identify it with reasonable certainty, should be so amended as to require a survey to be made witbin a few months of the discovery, and the boundaries given in the location certificate, hesides stating the connections from the discovery point to a corner and to a U. S. monument near it.

An addition to Sec. 2402 making the location void unless the stakes are maintsined would improve the condition of the District Court docket.

Now as to the annual assessment. The miner only preserves his right to the claim if he does this required work of $100 annually, or before some one else "jumps" it. I know that the most frequent allegation in adverse suits by the plaintiff is that the assessment work of the previous year or years was insufficient to hold the claim, namely, was less than $100 in value. When this is raised in court, the matter is not easy of proof. Often the labor certificates which are filed are questioned, for there may be ten such annual certificates to prove the expenditure of, presumably, $1000, which should agree with the amount of work actually visible. The total length of tunnel or depth of shaft may be less than would seem to correspond to the expenditure. Stress laid upon this point by the attorneys may bring defeat upon the owner who honestly intended to follow the requirements of the law. This uncertainty should be reduced to a minimum, and the writer's experience as a surveyor prompts the suggestion that the law be altered to require a stated distance per year instead of a specific sum of money. Ten feet of shaft or fifteen feet of tunnel would be a fair average equivalent. In some districts this may be more than an equivalent of the present $100, but in any given county the expenditure would be nearly uniform. Each annual labor certificate might be required to state where the work was done and the lengths before and after the work.

The writer also favors the change of the laws to a universal application of what is, in Colorado, known as the "side line law." Every one knows the various quibbles at law regarding the apex interpretation and bended claims to follow curved outcrops, to say nothing of its effects upon "blind leads." A law which repeals the right of indefinite pursuit in depth may at first sight seem to be against the interests of the miner, but a little consideration of the subject would prove it to be otherwise. There would he less litigation; that is worth remembering. Then

a very steep vein would give the owner a great depth before the vein goes beyond his side lines. It would not pay his neighbor in many cases to sink a deep shaft to catch the extension. Besides, there would be nothing to prevent a discoverer from locating parallel claims on each side of the outcrop discovery and thus cover as much ground as he wants to hold. All the work of assessment to hold the several lode claims could be performed, as now, upon the original discovery. All could be patented together, as now. In flat veins the same could be done, except that the discoverer would locate more adjoining claims, according to the dip.

Such a law would then do away with all trouble over the intersecting lodes and veins, and in every way so simplify the matter that our mining legal fraternity would have no such "snaps" as it has enjoyed these many years.

Hoping that your agitation of the subject may prove fruitful, I remain yours truly, M. C. IHLSENG.

State College, Pa., Dec. 6, 1893.

Too Many Idle Mines.

It is gratifying to notice that in many parts of California men of capital and energy are acquiring possession of quartz mines which have been idle for many years, and are making a systematic effort to reopen them and place them on a dividend-paying basis. The proportion of non-producers which contain pay ore in the list of California mining properties has been altogether too large. There is no important mining district which does not contain one or more mines with fine records as producers, which have from one cause or another been shut down for years. The shafts have caved in, the mines are full of water, the surface works have fallen into decay, and the properties are of no practical value either to their owners or to the community in which they are located. It is not necessary in this place to review the reasons which brought about this deplorable state of things; suffice it to say that the number of good California mines in this condition is large.

The movement for acquiring control of these mines is general. The methods of payment are various, the consideration at times being cash; or the owner takes his payment, or part of the payment, from the proceeds of the mine; or he parts only with a working interest; and so on. It is seldom, however, that a buyer will pay cash outright on the mere history of these mines. They have been shut down so long that statements as to their output do not receive the credence that they perhaps deserve. A buyer wants to see the mine opened up before committing himself to a heavy outlay. He wants to see what ore is in sight, the size of the ledge, the character of ore, and there are many other things he must know for himself. He knows it is unsafe to buy on hearsay; and it is not often that he can be persuaded to do so. In many cases, owners, conscious of the merit and value of their properties, and rich enough to be independent, refuse to entertain any proposition having conditions attached to it; and, as a consequence, many of these mines seem likely to remain non-producers. In other cases, owners are financially unable to do anything with their properties, and are unwilling to enter into any arrangement with others which does not insure them much the largest share of the profits. Naturally, few men are ready to furnish working capital, put up a new or refit an old mill, resink a shaft and drain a mine, without reasonable assurance of remunerative returns, comprising a fair share of the profits.

The common ground on which these two interests may meet is hard to find, and it is difficult to lay down a general rule applicable to all cases. The conditions are always different in different places. But it is probable that at no future time will capitalists be more friendly disposed toward investment in gold properties, or more anxious to acquire an interest in them. It therefore behooves owners to make concessions to the demands of capital, for the time may never be more propitious, and the mines never considered more valuable.

IT has been suggested that the safest way for claimants who give notice that they intend to hold and in good faith to work unpatented mining claims, in order to secure the benefit of the assessment work suspension act, will be for them to have the recorder return their notices after they have been recorded, with his certificate thereon showing that due record has been made. It is not necessary to put up a duplicate or any other notice at the mine. It is probable, too, that the law will be fully complied with if the owner or owners of several mines in one district unite in one notice. Still, separate notices would be better.

THE California Debris Commission met Tuesday and granted John Spaulding, owner of the Polar Star mine at Dutch Flat, permission to work his mine by the hydraulic process. A. Denmire was authorized to build seven small dams below his mine near Sierra City, for the purpose of restraining debris.

Mines on the Lower Colorado River.

IN TWO PARTS—PART I.

How much a dunce that has been sent to roam
Excels a dunce that has been kept at home.

During the past two years the writer, in a professional way, has visited many mining localities and districts of the Pacific coast, from British Columbia on the north and well into Sonora, Mexico, on the south, and the result of these investigations has more firmly emphasized the superior advantages held by the mines adjacent to Yuma. It would be unjust to invidiously compare any certain locality with these lower Colorado river districts, as any one at all familiar with mining will at once see the natural advantages peculiar to the locality herein referred to. It is well to bear in mind that neither "glittering generalities" nor unresponsive, prospectively valuable and untried districts will be considered but demonstrated.

Tangible Paying Mines, in all that the word implies; mines owned or leased by working men—poor men, but who are gradually but surely digging from these mines, if not riches (as the word now goes), a competence, and that in the face of a debased metal, for they are silver mines. To illustrate what has been and what can be done, by muscle and grit and a grubstake earned by polishing drill-heads, take the example of Frank Vomocil. Some envious, less energetic people may call it "Luck;" just prefix P and read it "Pluck"—that's the whole story. Vomocil, about 1886, located the abandoned Eureka district mines and, shortly thereafter, certain deserted Castle Dome mines, after exploring the old working thoroughly. Not a soul lived in either place at the time. Working alone, 14 hours a day, a few months, proved the office mining, heretofore controlling developments in Eureka and ending in disaster, yielded to more practical work, and the mines have been steady producers since and have supported a camp of 40 to 100 people.

The story was repeated in Castle Dome district, others following in the lead set. Vomocil is pretty well fixed now, leasing and supervising his holdings. There is no place in the writer's knowledge where an able-bodied, rustling miner can do better than in "tribute," or leased working, on the "soft ores" of the lower Colorado river, even with silver at 70 cents and lead at $3 50.

We will not consider the old placer diggings at the Pot Holes and Lagunas. There is gold there, but it will not pay for the extraction by the chimerical pump methods attempted, as was publicly foretold by the writer at the inception of pump work, but we will note the first district of importance reached by steamer above Yuma.

The Castle Dome Mining District.—The mines are situated on the flat mesa and rolling hills near the base of a lofty mountain range, here forming a horseshoe curve. A system of three parallel veins cut through the country at the outer points of the curve, with a N. W. and S. E. strike, and at an elevation above sea level of 1800 feet.

They are readily accessible over hard, level mesa roads and "wash," 20 miles from Castle Dome Landing and post office, on the Colorado river, thence 30 miles to Yuma by steamer or wagon road, or to Gila City, a station on the S. P. R. R., all road, and one handling of ore saved—a distance of 30 miles. Present transportation rates to Castle Dome Landing by team are $6; thence by steamer and rail to San Francisco, $9, or a total of $15 per ton; Gila City, $7; team, $8; rail, $15.

The country formation is porphyry. The mines lie in a contact of porphyry and granite, with a dip generally to the east of 45°. The ledges are from two to four feet wide. The vein stuff is decomposed porphyry. The mineral, argentiferous galena and lead carbonates, are in a gangue of fluor and calcspar, with considerable iron oxide. It is a clean smelting ore, carrying no deleterious base material. It is cheaply mined, but little powder required, and that of a "slow," low-grade kind. The ore ranges in value from 20 ounces to 90 ounces silver and 60 to 80 per cent lead per ton.

These mines under the old regime yielded steady, remunerative shipments for about 20 years, when work was stopped at water level, 300 feet in depth. Understand, the veins of this district in no instance "pinch out;" they continue, and in ore where work was suspended. It probably cost ton much at the then price of lead to mine and extract ore 200 and 300 feet deep by hand windlass or whim, though this is the present way of hoisting. Advised by some of the old-time workers in these mines of the location of favorable indications of ore, the present owners have uncovered large ore bodies in virgin ground above water level, and the result is a steady and assured output.

The number of men actually employed at the mines is above 100, and three ore teams steadily on the road. The Hodge Bros. are operating the "Washington group;" Frank Avila and John Stofella shipping from the old "Pocahontas" and "Arkansaw" mines, and a large force on Frank Vomocil's Railroad group of eight claims. Much more could be written of this interesting and thriving camp, but space forbids.

Eureka Mining District.—Twelve miles north of Castle Dome Landing, 42 miles from Yuma, is found the Eureka district and mines. Extensive work was done here before the advent of the railroad to Yuma. It is exceptionally situated for cheap mining. The outside mines are not one mile from the river bank, and those now working not one-fourth mile off.

Here the mountains rise abruptly to greater height than any other range on the lower river, thus allowing economical working by tunnel. The formation is block slate. The ledges are of a width of two to five feet, between firm walls with a strike N. W. and S. E. Gangue matter is of lime-spar and quartz, and a clay gouge or casing on the hanging wall, dipping to the east and under the mountain at 46°. The ore is silver-lead with seams and pockets of iron oxides, and "free" until water level is reached, when some zinc blende is found in seams paralleling the galenite. Water is found at river level. A hand pump handles the inflow in shaft sinking. At present, as in the past, there is plenty of virgin ground to exploit above water level that is responding favorably to "tribute" workers now on the ground.

The ore averages 50 ounces silver, 60 per cent lead per ton. Sufficeth to say the Vomocil group, with the "Mina Alta," an outside strong vein on ore, comprise the mines of this district. They have supported 60 to 100 people, and shipments are regular, for years past, and to-day below Eureka proper, one mile away, Charley Thiesen has a claim from which he has made shipments in times past.

The Azure King Group.—Two miles north of Eureka and a half mile from Steamer Landing is situated the Azure King group of six claims. This is a gold-silver-copper proposition, was worked extensively and ore shipped via the river and Gulf of California to San Francisco in an early day. There are numerous shafts on the vein from 20 to 60 feet deep, in which the notched pole ladders yet in the shafts show the primitive method used in packing out ore and waste on the backs of men in days long since. The mines are situated just within the porphyry mountain range that parallels the river.

The veins have a N. W. and S. E. trend, are two to six feet wide, with a quartz gangue in the talcose-schist vein matter. The copper occurs as a "chalcocite" copper glance; "tetrahedrite," gray copper, sparingly; "cuprite, red copper; and generously of "malachite" and "azurite," or green and blue carbonates of copper. (Hence the name.) Crude hand-sorting of the vein as it runs returned an assay value of: No. 1, gold, $47.54; silver, 15 ounces; copper, 12 per cent; No. 2, gold, $24; silver, 16 ounces; copper, 13 per cent. It is safe to assume an average value of $12 gold; $10 silver, and 10 per cent copper to the ore in place.

These claims will be worked at a profit some day, as they are exceptionally easy of access and free, containing not a trace of arsenic, and can be cheaply mined and treated on the ground. Handsome specimens containing coarse free gold imbedded in malachite are not uncommon.

TAYLOR D. MACLEOD.

San Francisco, December 11, 1893.

Dissimilar Occurrences of Gold-Bearing Quartz.

Abstract of Contribution to Discussion of Mr. T. A. Rickard's paper by Philip Argall, before the Colorado Scientific Society.

The coincidence of the pitch of an ore shoot with the line of intersection of the planes of stratification of the country rock and the lode fissure, appears to me to be an undoubted proof of the favorable influence of certain zones of country rock on the deposition of ore in veins.

Probably no phenomena of vein formation have been more carefully noted or more often described than this "influence of the country rock on the deposition of ores in veins." It may, however, be permissible to quote briefly some authorities bearing directly on the subject.

Muller, describing the Freiberg ore deposits, states: "The lodes in general, without distinction in regard to the character of the formation, have attained a development favorable to mining only within compact rocks, in which feldspar or quartz, hornblende, pyroxene, as also carbon (graphite, anthracite), form an essential ingredient."

W. J. Hemwood, in describing the metalliferous deposits of Cornwall, states: "The lodes are closely related to the rocks immediately adjoining them. Their structure, like that of the rocks, seems in some measure dependent on their mineral characters. * * * * * Most bodies (courses) as well of tin as of copper, have within their respective lodes an endlong dip or shoot, which usually approximates to the contour and bedding of the neighboring granite, and to the inclination of the cleavage planes in the adjacent slates. In each of our several mining districts the lodes are productive on similar lines taken at right angles to their respective directions, hence the phrase, 'ore against ore;' but as the direction of the lodes varies in dif-

ferent districts, the direction of these productive lines is not always the same."

Professor Moissenet, in his extremely valuable publication, also gives this matter a careful analysis, terming the coincidence observed by him the "influence of parallelism, or *vis a vis* of riches in lodes nearly parallel."

J. H. Collins, in describing the lodes of Cornwall, states "that some lodes have copper ore only in slate, and tin ore only in granite, and at the Botallick mine one of the lodes was found to pass three times from granite to slate, or the reverse, containing none but tin ore in the granite, and none but copper ore in the slate."

The classic example of the influence of the country rock on the deposition of ore in veins is found at the famous Kongsberg mine, in Norway, discovered in 1623 and worked almost uninterruptedly since. The silver veins are found most productive in certain belts of rock called fahlbands, which are irregular in their dimensions, the greatest thickness recorded being 1000 feet. They are parallel in strike and inclination with the gneissoid and schistose strata in which they occur, and are subject to the same local disturbance of stratification. These fahlbands are traversed by fissure veins containing silver ores, and long experience has shown that these veins are productive *only* where they intersect the fahlbands.

The example given by Mr. Rickard is interesting, inasmuch as it shows that at least one of the observed laws relating to the deposition of ore in veins in the Northern hemisphere has a further confirmation from the antipodes. It also furnishes an excellent illustration that the aphorism, "ore against ore," is only true when the dip and strike of the favorable beds are taken into account.

I have seen many cases of "ore against ore" in parallel veins in eruptives, an example being the Kapanga mine, New Zealand. Here two parallel veins have the same dip (33°) and are separated by 80 feet of tufa. The ore shoot in the Kapanga vein was found to fairly correspond with that in the parallel Scottys vein, and what is more curious, the rich ore in both shoots ceased to exist at about the same depth from surface, thus, as it were, proving the correctness of the theory ("ore against ore") in both directions. I could not detect any change in the country rock along the course of the veins; the same rock formed the walls of the ore shoots, and also the walls of the unproductive parts of the veins.

The Gymple Reefing Fields, in Queensland, described by Jonathan C. B. P. Searer, are remarkable for the fact that the lodes depend upon the character of different bands of rock they pass through for the extent to which they are auriferous. Bands of black slate occur with diorite and other rocks, and it is in the *black slate* that the lodes contain most gold, being comparatively poor in other parts. Four bands of this black slate are known to exist, and so dependent are the reefs on it that the miners first sink to cut the slate, then drive to where a reef passes through it and start to work the lode at that place.

In the Coromandel mines the gold is extremely bunchy, the vein quartz seldom pays to crush unless free gold is visible, and when it is visible the picked stone is usually estimated at onnces of gold per pound of quartz, instead of per ton; the 2½-ounce-per-ton returns given in Mr. Rickard's paper are not at all unusual. I, myself, have seen many lots of picked quartz that ran from 3 to 5 ounces of gold per pound, and small lots that contained 7 ounces. So coarse is this gold that the mill dirt from rich pockets will seldom run over 2 ounces per ton of rock, showing how easy it is to pick out the gold by hand. The veins are perhaps best described as specimen veins.

Native arsenic occurs very frequently associated with rich gold quartz in the Coromandel district, and arsenical pyrites is very abundant; green chloritic minerals are also common in association with the richest pockets, particularly when the pocket is near a veinlet, dropping in from the hanging wall.

Arsenic in one form or another is concomitant with gold in all the deposits I have any knowledge of, and where arsenical and iron pyrites occur in a gold vein, the former is invariably richer in the precious metal.

Sometimes the arsenic minerals in gold veins are not at all apparent, as for example, in the Gilpin county ores. In this connection Mr. Richard Pearce, of Argo, states:

"In an almost daily examination of these ores for 18 years, I have never seen but one small characteristic specimen of arsenic-pyrite; nevertheless, in roasting Gilpin county ores an appreciable amount of arsenic is always found, so that arsenic may be said to be present in these ores in some form which does not make itself manifest as belonging to any mineralogical species, but rather as an accessory impurity."

Telluride minerals are also found in most gold veins.

It is an undoubted fact that organic matter may act as a precipitant of gold, from its mineral solution. The example given by Mr. Rickard in the "indicator" is as instructive as it is interesting. I would particularly call attention to the enrichment of the quartz in the neighborhood of the graphitic clay seam, which is, I believe, rather unusual outside of Victoria. The series of lodes in California called by courtesy the "mother lode," do not, I believe, show any enrichment in the slates, in diorite or in serpentine. It has been observed, however, that in slate the lode is almost entirely composed of quartz, while in serpentine a considerable amount of gangue is invariably included in the vein.

Professor Silliman has found tellurides of gold and silver abundant in some portions of the mother lode, while he gives the name "mariposite" to a green scaly mineral which is very characteristic of the lode. Ribbon quartz, that is, quartz having alternating streaks of quartz and a dark-colored mineral, is usually richer in gold than the ordinary vein quartz. This dark-colored mineral is itself rich in gold, and is of varying composition. It may be a thin film of slate; very often it is graphitic material, while, according to J. A. Philips, it is in the California quartz veins, sometimes roscoelite and micaceous mineral containing over 28 per cent vanadium oxide.

Black graphitic scale is sometimes, however, unfavorable to the enrichment of mineral veins, an example being the cupreous iron pyrites lodes of Wicklow, Ireland, where the lodes are very bunchy and unusually unproductive in the "coal ground" of the miners. I have very often found pyrites in spheroidal forms in this graphitic shale, and occasionally native copper in the laminæ. In this connection I made some experiments with the mine water (which held copper and iron sulphates in solution), looking toward the reduction of the copper by the shale. My experiments, however, were only successful when the pieces of shale were immersed in the mine waters in contact with pieces of metallic iron. Under these conditions I secured a beautiful deposit of metallic copper on the shale, due, no doubt, to the galvanic current generated.

Commendation for Mr. Edman.

TO THE EDITOR:—Your issue of the 25th ult. contains what appears to be the closing article of the series entitled "Studies in Gold Milling," contributed to your paper by Mr. Edman. I have read all of them with pleasure and profit, and would desire to express my appreciation of the writer's investigations and communications upon a subject which has always been of much interest to me, as to all mining engineers. T. A. RICKARD.

Denver, Colo., Dec. 11, 1893.

Foundry Notes.

THE Mammoth mine of Arizona, near Tucson, has purchased one of the Griffin roller mills. It was to have been started up this week.

THE Union Iron Works is preparing to make a complete exhibit of mining and other machinery at the Midwinter Fair. A conspicuous part of the exhibit will be that pertaining to marine architecture and ship-building.

REPRESENTATIVE MAGUIRE, of California, is endeavoring to have scrap iron and scrap steel placed on the free list by changing their classification in the Wilson bill. They are now classified with pig iron and are made subject to the same duty. Maguire claims, on the authority of iron manufacturers, that scrap iron requires one more heating in the process of manufacturing than pig iron does, and that the additional process is equal in cost and waste to the tariff on pig iron. Several Democratic members of the Ways and Means Committee have expressed themselves as favorable to this view.

MESSRS. GEO. A. WOODBURY and F. A. Huntington are arranging to show at the Midwinter Fair the practical operation of the Huntington mill and Woodbury concentrator. Space 42x22 feet has been assigned them in the Mechanical Arts building, and they will place therein an ore-crusher, ore-feeder, five-foot mill, plates and concentrator, with necessary fittings, all of which shall be in actual operation. Quantities of ore from two to five tons will be milled free of charge, and the full returns of free gold, together with the sulphurets, given to the owners. For quantities above five tons reasonable charge will be made. It will no doubt be one of the interesting features of the mining machinery exhibit.

THE shaft upon which the Firth wheel, at the Midwinter Fair, will turn has been placed in position. It is of cast steel, 12 inches in diameter, 22 feet long, and weighs just 7012 pounds, while with its flanges and the bearings upon which it will turn there will be nearly 18,000 pounds of iron and steel on which the wheel will turn. The diameter of the wheel itself is to be 100 feet, but with a site having a natural elevation of 30 feet above the level of the main buildings, and a foundation 20 feet high, the extreme altitude of the wheel will be 150 feet, and it is from this height that those who ride in the swinging cars will view the surrounding landscape and the great expanse of the ocean. No pains have been spared by Manager F. V. Dubose and his assistants to assure themselves that the wheel shall be absolutely safe. The foundation alone weighs 712 tons, and is composed of rock and cement. The wheel represents 96 tons of weight, and with ten people in each of the 16 cars will carry 12 tons more. The foundation, bearings and supports have already been examined, passed upon and approved by the consulting engineer of the exposition.

CHARLES W. OSBORNE, of Redding, the discoverer of the rich Gladstone gold mine, and J. C. Petty, another well-known California miner, have left for the gold mines of Johannesburg, South Africa. They will go west, instead of east, to get to their new field, and accordingly they sailed on the Alameda, Dec. 14th, on her outward trip, and go to Australia. From there they will proceed to Cape Town.

Sliokens.

PROF. ARCHIBALD B. MCCAW expects to leave in a few days on an important business trip to New York.

As a result of the recent heavy rains the Klamath river rose eight feet. Most of the mining appliances of the river claims were swept away by the flood.

THE Kimberly diamond fields are said to have produced since they were opened in 1870, on an area of two miles square, diamonds to the value of $350,000,000.

THE Gruh Gulch district in Madera county is coming to the front. More men are now at work there than ever before, and the mines are giving excellent results.

THE Poorman mine at Burke, Idaho, has shot down until spring or longer. One hundred and eighty men were discharged and thirty retained on development work.

THE Sutro people propose to have the first mule that ever pulled a car of dirt in the Sutro tunnel on exhibition at the '49 camp at the Midwinter Fair. It is over 30 years old.

THE Green Mountain mine, owned by the Messrs. McSorley, and located in Chili gulch, about one and a half miles from Mokelumne Hill, Calaveras Co., was sold last week for $17,500.

THE Malvina Gold Mining Company has been incorporated in San Francisco. Directors—S. H. Smith, G. W. Osborn Jr., C. F. Bunker, G. W. Waitt and A. Summerfield Jr. Capital stock, $500,000.

THE Kennedy Mining & Milling Company is the largest taxpayer in Amador county, being assessed at $500,000. They pay a tax of $10,000 for State and county purposes and $600 on the Jackson school bonds.

THE following Bodie mining companies report having had cash on hand on December 1st: Bodie, $10,498.28; Mono, $4738.90; Standard, $26,211.18. The following were in debt: Bulwer, $4254.30; Summit, $1054.36.

THE Gladiator Gold Mining Company has been incorporated in San Francisco. Directors—J. E. Doolittle, Joseph Marks, Henry B. Havens, William A. J. Doolittle, J. M. Harper. Capital stock, $1,000,000, all subscribed.

MR. J. C. KEMP VAN EE, manager of the Poorman (Idaho) Consolidated Mines, Limited, has left Silver City for London, to be absent until January 10th. When he returns, the stamps in the company's mill will begin to drop.

THE Seven Devils region in Washington county, Idaho, is attracting a good deal of attention. Some visitors declare it has some of the best copper ledges in the world, and that it is destined to rival the Cœur d'Alenes as a lead-silver camp.

THE Geneva Gold-Mining Company has been incorporated. Principal place of business, San Francisco. Capital stock, $10,000,000, with R. W. Lamb of Virginia City, and David Fay, W. W. Lent, John Fay and T. J. Mitchell of San Francisco as directors.

THE Nevada Mining and Reducing Company has been incorporated. Principal place of business, San Francisco. Capital stock, $1,000,000, with Albert H. Stratham, W. S. Barton, David Carr, W. J. McFarland and Edward J. Weir of San Francisco as directors.

THE Siwash Creek Gold Mining Company, Limited, has been incorporated in the city of Vancouver, B. C., by C. T. Dunbar, E. L. Phillips, B. T. Rogers, C. J. Loewen, C. St. A. Pearse and M. W. Elphinstone. The capital stock is $500,000, divided into shares of $10 each.

THE Leavenworth Coal Company has been organized, composed of F. A. Loosekamp, J. W. Arthur of Leavenworth, this State, and J. R. Allen of Spokane. The company has bonded a coal mine on Chumpstick creek, a tributary of the Wenatchee river. The amount of the bond is $10,000.

THE Cedar Creek Mining Company has been incorporated. Principal place of business, San Francisco. Capital stock, $1,000,000, with Andrew Rodger of Alta, and Chauncey B. Hutchins, Richard L. Dunn, Donald McDonald and Peter L. Dunn of San Francisco as directors.

THE Morning Star gravel mine of Iowa Hill has just declared another dividend of $1 per share. Besides declaring a dividend, the company has purchased from the proceeds of the mine a large tract of land adjacent to their claim. It is rumored the purchase price of the tract of land was $7000.

THE Halls Mines, Limited, is the name of a corporation recently formed. The mines of the company are located on Toad mountain, B. C., near the town of Nelson, known as the Silver King group, and consisting of five mining claims. The British Columbia office of the company is located at Nelson.

IN the United States District Court at Boise City, Idaho, the remaining Cœur d'Alene contempt cases have been dismissed. The cases included 75 defendants and were for a violation of the injunction of the court restraining striking miners from interfering with miners at the time of the strike last year.

JOHN DIX, a miner, arrived in Juneau a few days before the steamer Al-Ki sailed south, with a pound of coarse gold. He made his "find" on Jacobi island, in Icy straits, 175 miles northwest of Juneau. The gold is found in decomposed quartz, and again much coarse gold was discovered. The discovery is regarded as the best in Alaska for several years. A party of miners left Juneau two weeks ago to locate claims.

THE official guide of the Midwinter Fair will be published by George Spalding & Co. of this city, to whom the exclusive privilege has been granted by the management. It will be a volume of about 200 pages, book form, containing a complete description of the fair—its features, large and small, and, in short, all details connected therewith that may be of interest or value to a visitor. No other guide will be permitted to be circulated within the grounds, or none other has the official sanction of the fair management.

AT noon December 10th the last rail of the first division of the Midland Terminal Railway was laid. The line is a Santa Fe feeder from gold mines of the Cripple Creek district, reaching the Santa Fe at Divide. It is now finished to Midland, midway between Cripple Creek and the main line. Over 500,000 tons of low-grade ore has been held awaiting construction of the line. With only half the line built it will be possible to operate many mines at Cripple Creek, now closed on account of high transfer rates.

The Nevada City Mining District.

EDITORIAL CORRESPONDENCE.

NEVADA CITY, CAL., Dec. 8, 1893.

It is a pleasant thing, in these days of industrial depression, to visit a region which has entirely escaped the recent pinch of hard times, and which is enjoying a full season of prosperity, undisturbed by general outside influences and unequalled for more than two decades in the history of California's mining industry. A new era of development has begun for Nevada county, and the past two years have been marked by activity and great material progress. It has fairly begun to recover from the blow inflicted by the shutting down of hydraulic mining in 1884, and by the subsequent restriction of quartz-mining operations. The distribution of activity, it is true, is yet somewhat uneven, and the roar of the hydraulic giant is still unheard in the great gravel districts, where decayed flumes, idle pipe lines, deserted pits and depopulated towns tell a tale of desolation and ruin melancholy as death. One cannot appreciate the full extent and vital consequences of that bitter conflict which waged for years between the valley and mountain interests until he sees actual evidence of its devastating results. The sentiment of the disinterested was, years ago, largely behind the anti-debris element, because of a widely prevalent and carefully nursed conviction that it was battling for hearth and home. It seems just to have dawned on the public mind that, with victory for the valley people, the blight of starvation descended upon and withered towns, villages and districts whose whole dependence was the life of the hydraulic industry, and that the issue was of the highest moment to them and their people. They were driven from home and fireside and compelled to restore their broken fortunes elsewhere. Their hardships were great, but let us hope their reward will be greater.

These reflections are impressed upon the visitor who makes a tour of Nevada county. The wreck of a great industry is in places the first and almost the only thing he sees. But elsewhere he finds substantial evidences of growth, wealth and happiness, and it is these it is the purpose of this letter in part to review. There are signs of reviving life in hydraulic mining, and it is probable that a few years will witness an approximation to its former dimensions. Quartz mining has in the Nevada and Grass Valley districts experienced a very notable revival, and all parts of the county partake more or less in its benefits.

The salient feature of recent developments about Nevada City is the general movement in the direction of deep mining. It has been demonstrated beyond the possibility of chance that deep sinking is attended by profitable results; and steady downward progress is now being made in several of the important properties of the district. It appears to have been the rule in the district that, when development reached a point in the neighborhood of 1000 feet, barren rock would be encountered, and, in many places, the impression was prevalent that the ledge would pinch out; and it remained for the Providence Mining Company, through its superintendent, Col. Carl Davis, to disclose the real value of the deep quartz. The Mountaineer mine continued sinking its shaft after poor rock was struck, and found pay ore; but the result of its operations does not appear to have been so widely advertised or so directly instructive and beneficial to others as in the case of the Providence.

The history of the Nevada City mining district, following the cessation of hydraulic mining in 1884, was of gradual decay and suspension of operations in the ledge mining. One mine after another shut down, until, about three years since, the only important property being operated on a large scale was the Providence, on Deer creek, one mile west of town. It is true that work was going on in the Champion and in some other mines, but generally on a limited scale. The Champion has been running steadily for some years, but it is only recently that it has assumed the position of one of the leading mines of the district. Because the mine appeared to be gradually working out, and there seemed to be no prospect of a change for the better, operations were suspended on the Providence. After an interval of a year or more, the property changed hands, and vigorous preparation was made by the new company for its active development. The new owners were convinced that there would be improvement in the quartz at lower depths; and they believed also that a different method, or rather direction, of development in the upper workings would prove remunerative. The reasons that brought about this conviction it is not necessary to rehearse; nor, indeed, are they all matters of general knowledge. It is probable that they are to be found in the success of similar methods in the neighboring Grass Valley district; in a general knowledge that deep-mining, properly and intelligently conducted, pays as a rule; and in the absence of satisfactory proof that no ore except that too low-grade to mill, or altogether barren, exists at great depths. Whatever the reasons, they were sufficient for action and for the expenditure of time and much money. The ledge was followed down by shaft and drift, with results most satisfactory to the management and owners. Development in the upper workings, too, has been most gratifying; and there is in sight now a very large surface of pay ore. Thirty stamps pound ore day and night. The sulphurets run from 6 to 8 per cent of the ore, and are treated by chlorination at the company's works. The expense of mining and milling at the Providence is $4.20 per ton. The expense of chlorination is about $10 per ton. The sulphurets carry about 15 ounces of silver to the ton, so that the cost of operation is fully covered by the amount of silver obtained. The exact value of the sulphurets per ton is not given, but it is high. The shaft of the mine is down 1400 feet in the eastern vein, which has an incline of about 40 degrees. The mine has three veins, the "front," "contact" and "slate." A feature of development of the mine is the upraise from the 1250 level to the 600 level. The mill has a steam-plant to be operated in case of failure of the water supply.

The Champion mine rivals the Providence in importance and in extent of operations. Their methods of milling, as well as the capacity of their plants, are almost identical. The feature of the Champion mine is the capacity of its hoisting works, recently installed, to which reference was editorially made in the MINING AND SCIENTIFIC PRESS, December 9th. There is sufficient power to operate the plant at a depth on the incline of 5000 feet, development to that depth clearly being contemplated. The Champion property is very extensive, embracing the Merrifield, Climax, New Years Extension, Müller, Phelps, Ural Relocation, Bavaria, Merrifield Extension and Mary Ann claims. Two parallel veins are included in the property, the eastern being the Merrifield, the western or footwall vein the New Years. Development by tunnel on the New Years vein, coursing north and south, and dipping to the east at an angle of 42°, has been extensive. The tunnel penetrates to a distance of 3000 feet, and attains a depth from the surface of 600 feet. Operations are now confined to the incline shaft and drifts on the same vein, the former reaching a distance of 1250 feet. Sinking is going forward at the rate of 12 feet per week. It is said that the former hoisting works will be used for development of the Merrifield vein.

Other important mines, upon which much the same manner of development as in the two foregoing is going ahead, or will occur, are the Nevada City and the Mountaineer, these four generally being given by local miners as the best instances of the now well-established axiom that deep mining pays. It is now undoubted that in the future work in the district no mine will be considered worked out until sinking has taken place to depths lower than now reached; and it is likewise undoubted that the successful examples of these mines will establish the method of mining for the future. There are a number of idle mines about Nevada City which are now encouraged to resume operations. They were operated in former days, but have—many of them—been idle for years. The early paying mines include such as the California, Banner, Cunningham, Deadwood, Federal Loan, Gold Tunnel, Lecompton, Italian, Mohawk, Murchie, Oro Fino, Pennsylvania, Sneath and Clay, Stiles, Union, Wigham, Willow Valley, Mattingly, Charronat, Grant, North Star, Potosi and many others. Some of these were famous as producers. Most of them turned out ore running from $5 to $100 per ton, and more. Apparent failure of the ore is by no means the sole cause of their suspension. Inefficient management, quarrels among owners, inducements to go elsewhere, all contributed their share. Their reopening is fully justified by their records, or by the precedent of mines now operating.

It is not the purpose of this article to enter into a detailed account of the workings of mines in this district. That service has been very fully and thoroughly performed by other correspondents. One or two mines are used as types and their leading features taken as subjects for discussion. The mining and milling systems at the Providence and Champion mines are efficient, systematic and economical. The controlling principle of operations is to obtain a maximum of results at a minimum of expense. Chlorination is an essential part of milling operations, the ore being uniformly highly sulphuretted. Both gold and silver are saved, and the loss is reduced to a very low fraction. At the Champion mine there is a roasting furnace 60 feet by 11, with a capacity of 12 tons. The total time occupied by a charge from its entrance to its withdrawal from the furnace is four days. Less time is occupied at the Providence, owing to a difference in the ore. The characteristic difference between Nevada City and Grass Valley ores is in the heavy sulphurets of the former. At Grass Valley the average is perhaps not above one per cent. In the Idaho, sulphurets run one-half of one per cent. The ore in both districts is free-milling, and generally high-grade. Other points of difference worth noting are the larger size of the Nevada City veins and the uniform dip of the ledges, somewhere in the neighborhood of 40 per cent. The geology of the district is varied. At the southern portion, adjoining the Grass Valley, it is diabase. This gives way to metamorphic slate. Nevada City stands upon a formation of syenitic graoite. A belt of graoite comes in from the northwest, strikes down Woods ravine, crosses Deer creek west of town, and passes south to Gold Flat. Extending farther east, it strikes Banner mountain, and, turning north, crosses Willow valley. The quartz veins of the district are large size—from two to six feet. The sulphurets consist largely of pyrites, with chalcopyrite, galena, and bleode in considerable quantities. Their value runs from $100 to $300 per ton.

Drift mining is now extensively followed along the Washington ridge, northeast of the city. In several instances operations have been conspicuously successful, and have proven a strong incentive to others to undertake similar development. The activity in drift mining on a large scale has taken place almost altogether within the past three years. The mines which have so far yielded best returns are the Harmony and West Harmony. No better brief description of this important district can be given than that contained in the recent report of the State Mineralogist, from which the following is condensed:

The elevation, or ridge, terminates at Nevada City. The channel extends west of that point nearly two miles, a great portion of which has been worked by the hydraulic method, the stripping, or erosion, of the volcanic capping rendering this method especially applicable to this portion of the channel. From the "Sugar Loaf," just north of the town, at the base of which the elevation of the ridge commences, up the ridge for a distance of over four miles there is a succession of mines. In configuration the ridge is very long and narrow, extending from Nevada City to the northeast some 20 miles into the Washington district; its width varies from one-half to one mile.

The ancient river channels appear to follow quite closely the course of the ridge; or, in other words, the ancient rivers, whose beds lie inclosed, appear to have followed quite closely the direction of the modern streams, which have eroded on either side and produced the ridge. From the Manzanita mine, at Nevada City, it is doubtful whether the gravel channel could be profitably worked in its course up the ridge by the hydraulic method. This fact is due to the deep capping of volcanic material above this point. As nearly as could be ascertained, the bedrock underlying the ridge has an elevation of 2650 feet in the Odin mine, increasing gradually in its course up the ridge. The elevation of the suspension bridge at Nevada City is taken at 2440 feet. The strata of gravels, sands and clays deposited by the ancient river have a depth of about 200 feet; above this the volcanic capping lies, with a depth of 300 or 400 feet. The bedrock is a soft, decomposed granite, containing hard bowlders varying in size from a foot or two up to 40 or 50 feet in diameter. These bowlders are sometimes intensely hard, costing as high as $12 to $16 per foot to drift through them. The gravel stratum profitably worked by the drift process is that lying directly upon the bedrock. Its character varies from a fine, free gravel, that admits of the perfect extraction of the gold by sluicing, as was found in the Live Oak and Nebraska claims, to a hard, cemented gravel, found in the deep channel in the West Harmony mine. In the Harmony gravel large quartz bowlders are found, in many of which gold can be plainly seen. But in all these graduations the gravel proper is composed almost entirely of quartz pebbles, fine dirt, and quartz cobbles. Whenever found in the channel proper the gravel is of high grade, yielding from $2.50 to $13 per ton. The gold occurs in coarse shots, for the most part disseminated through; no find of nuggets of any size has been heard of by the writer. The gold works its way into the soft bedrock, and in breasting the top six inches is taken out with the gravel. The depth of the gravel stratum extracted varies from 2 to 5 feet in the various portions of the grounds. It is a somewhat noteworthy fact that all the mines at present in operation are attacking the channels by means of incline shafts with varying angles, the bedrock tunnels extending from the bottom thereof into the channel. This is done in order to avoid a very long tunnel, which would be necessary if opening by tunnel alone were followed, and, secondly, to avoid the cost of driving through the excessively hard ground that would be met with when going through the high rims. The tunnel into the Cold Spring ground, though very small in size, cost as high as $16 per foot for a long distance. There is little or no water in the ridge; the amount in most mines is trifling, and is readily handled by an ejector using but a few inches of water. By sinking incline shafts easy ground is met with all the way, great speed is attained and the channel is intersected and prospected without the large outlay and long delay that would be occasioned by long bedrock tunnels or probably extremely hard ground. If the channel is found and gravel exists in anything like paying quantities, the high grade can readily stand the small additional cost of extraction due to hoisting and pumping, the less expensive tramming, furthermore, effecting this in part. A peculiarity noticed in the method of working was the use of augers to put down holes in the bedrock. At times this becomes stiff and tough, making work with the pick slow and laborious and drilling with hammer and drill slow. By means of sharp augers holes can be bored very rapidly, and by using powder quick progress can be made. It is stated at some mines that a reduction in the cost of labor of nearly one-half is effected. Ejectors, or hydraulic elevators, are used to free these mines of the small amount of water that they make.

The Nevada City channel has proved a very rich one in past workings. The Live Oak and Nebraska claims, worked out in the 60's, yielded heavy returns to their owners. It is stated that 3000 feet of this channel yielded $4,500,000. Since the cessation of operations in these mines no systematic work has been done, and the rich channel was not discovered until met in the Harmony mine. It is stated that the Harmony gravel at present returns $10 to $13 per ton when crushed in stamp-mills. It is claimed that, with proper economic working, gravel yielding $2 to $2.50 per ton will pay expenses.

These mines seem certain to be a permanent factor in the wealth of the district.

The result of all this development about Nevada City has been a very large share of prosperity for the town and district. The residents are careful to tell a visitor that the district is experiencing no "boom," but is simply enjoying the legitimate expansion which its merit has always deserved. As a consequence, all branches of local business are healthy; work is plentiful, money easy, and there is no poverty. The daily life of the inhabitants is pleasant, their means of social and intellectual enjoyment being varied. There is an excellent public-school system. The various leading church denom-

lnatlons have respectable representation. There are two good daily papers and two excellent hotels. There are water, gas and electric light works. Salonns are less conspicuous than in most mining camps. The people as a whole are intelligent, spirlted and very cordial. Public order is well maintalned.

It may not be amiss in this connection to refer briefly to the early history of the camp, whlch experienced more than the usual share of vicissitudes, and which has triumphed over them in a manner highly characteristic of a resolnte and generous people. It is the invarlable fortune of communities which depend for maintenance wholly or largely upon one industry to be elevated to great heights of prosperity and equal depths of depression. In other words, the history of the industry is the history of its followers. Nevada City has, therefore, thrived best when gold quartz mining has brought large returns; when the industry was neglected the town was lifeless and stagnant. The town was located in 1849 by home-seekers whn wandered into the mountains and found there a pleasant vale, with water, grasses, timber and apparently rich land in abundance. In 1850 vast impulse was given to the life of the struggling settlement by the discovery of gold quartz in the Coyote lead, immediately following a similar discovery at Grass Valley. In 1850 there was a population of 6000. Buildings were rude, the manner of life unconventional (characteristic of the early mining camps), but on the whole the population was more than usually law-abiding for those primitive days. In 1851 fire destroyed nearly all the business portion of the lively town, and it appears thereafter to have been fatally liable to similar disasters. September 7, 1852, twelve buildings were destroyed by fire. In 1855 there were two fires, infilcting damage to the extent of $50,000. The fiercest and most destructive conflagration in the history of the town occurred July 19, 1856, when the whole settlement was devoured by flame. Besides a very large number of frame structures, 22 "fire-proof" buildings were wiped out. Ten lives were lost, nearly all of leading citizens. Another fire ln 1858 destroyed $200,000 of property. In Decemher, 1852, heavy rains made transportation difficult, and even impossible, and no supplies could be obtained. Flour was $40 per hundred, beef 40 cents per pound. At another time a big reservoir in Deer creek broke, during a period of high water, and a cataclysm of water came pouring down the ravine, washing sawmills and all other impediments erected by civilization from its path. The damage was $100,000. Notwithstanding these severe misfortunes, the town flourished untll the breaking out of the Comstock excitement, early in the '60's, when much of its population deserted to the new field. Other events of importance have, of course, occured since then, notable among which was the completion of the Nevada county narrow gauge railroad from Colfax, in 1876. But the foregoing are snfficient to indicate the various difficulties which have impeded the progress of the town and district, and which it has in turn successfully overcome. There ls much of human interest in the struggle for existence of this indomitable mountain metropolis—much that demands both sympathy and admiration. But it cannot be more than referred to in this necessarily hasty and inadequate sketch. The populatlon of Nevada City is now about 5000. There is good reason to expect that there will be further material development in the near fnture, and that the scale of mining operations will be very much enlarged. E. B. P.

Revival of Mining.

That hydraulicking will be in force again, and at an early date, is now almost a certainty. The impounding of the debris by the aid of restraining dams will soon be proven practicable, and the cost of the construction of the dams is not as expensive as at first thought. To this new lease of life credit is due John Spaulding, who applied and was granted permlssion to build a dam at his Polar Star mine at Dutch Flat. It is now nearly completed and we learo on good authority that it will he accepted. Messrs. Benyaurd and Heuer, of the Debris Commission, inspected the dam last week and intimated that it would be satisfactory. If this experiment proves a snccess there will be many such dams erected during the next year. It is the foundation of a boom in mining circles. The estimated cost of the Spanlding dam is about $1500. An evidence of the life that is brought into a mining camp by even one mine was witnessed at Dutch Flat this week by an Aubnrn *Herald* man. Thirty men were employed on the Spaulding dam and thirty men left town in the morning and returned at night, dinner bucket in hand.

That there is yet millions of gold in these parts has heen demonstrated this summer at Dutch Flat. A great number of Chinamen, and a few white men, have been mining in the river beds on either side of that once-famous mining camp, using only the historlc rocker, bucket and pick and shovel. They have all made good wages, averaging from $3 to $10 a day. The heavy storms and the natural settling of the heavier material upon the bedrock have made it profitable to mine by this prncess. A thousand men, we believe, could now make good wages mining in this simple way in the vicinity of Dutch Flat, and we predict that in another year that section will assnme the aspect of the early days.—Nevada City Transcript.

The Wilson Tariff Bill.

Portions of the proposed Wlson tariff bill, in features affecting the mining and mineral industries, are as follows:

Article.	McKinley Law. Rate.	McKinley Law. Ad Val Equlty.	Wilson Bill. Rate.	Wilson Bill. Ad Val Equlty.	Decrease.
Marble and Stone.					
Marble, rough or squared	65c per cu. ft.	46.83	40c p. cn. ft.	30.82	16.01
Veined marb., sawed, dressed, etc	$1.10 per cn. ft.	55.54	75c p. co. ft.	37.87	17.67
Manofactures of marble	50 p. c.	50.00	30 p. c.	30.00	20.00
Burr stones, manufactured	15 p. c.	15 00			
Freestone, granite, sandstone, and other building stone, except marble	11c per cu. ft.	35.86	20 p. c.	20.00	15 86
Do. dressed or polished	40 p. c.	40.00			
Grindstones	$1.75 per too	12 69	$1.75 p. ton	12.69	
Slates, mantels, aod manofactures of slates	30 p. c.	30.00	20 p. c.	20 00	10.00
Roofiog slates	25 p. c.	25.00	10 p. c.	10 00	15.00
SCHEDULE C — METALS AND MANUFACTURES OF:					
Iron and Steel.					
Chromate of Iron	15 p. c.	15.00			
All other Iron ore	75c per ton	30 40			
Iron in pigs, kentledge, spiegeleisen, ferro-manganese	3-10c per lb	30.48			
Ferro-silicon	3-10c per lb	34.51	22·5 p. c.	22.50	12 01
Scrap iron and scrap steel	3-10c per lb	47.89	22·5 p. c.	22.50	25 39
Bar iron, rolled or hammered, in flats not less than 1 in. wide nor less than ⅛ of 1 in. thick	3-10c per lb	35 07	30 p. c.	30.00	5.07
Round iron not less than ¾ in. in diameter	9-10c per lb	60.00	30 p. c.		30.00
Square iron not less than ¾ in. square	9-10c per lb	60.00	30 p. c.		30.00
Flats less than 1 in. wide or less than ⅛ of 1 in. thick	1c per lb	63 01	30 p. c.	30.00	33.61
Rouod iron less than ¾ in. and not less than 7-16 in. diameter	1c per lb	63.61	30 p. c.	30 00	33.61
Square iron less lhan ¾ in. square	1c per lb	63.61	30 p. c.	30.00	33.61
Round iron in coils or rods less than 7-16 in. diameter	1 1-10c per lb	50.96	30 p. c.	30.00	20 96
Bars of rolled iroo not especially provided for — slabs, blooms, loops, etc.	35 p. c.	35.00	25 p. c.	26 00	10.00
Rallway bars of iroo or steel, T-rails	$13.44 per ton	56.00	25 p. c.	25.00	31.44
Rallway bars of flat rails, pnnched	$13.44 per ton	42.00	25 p. c.	25.00	17,00
Tin plates, terne plates and taggers tin	2·2c per lb.	75 61	40 p. c.	40.00	35.61
Sheet iroo or sheet steel, polished, planished or glanced	2½c per lb.	40.76	35 p. c.	35 00	2.76
Do. thinner than No. 10 and not thinner than No. 20 wire gauge	1·25c per lb		35 p. c.	35.00	
Do. thioner tban No. 20 and not thinner than No. 25	1·35c per lb		35 p. c.	35.00	
Do. thinner than No. 25	1·65c per lb		35 p. c.	35.00	
Steel ingots, blooms, shafts, pistoo rods, saw plates, etc.:					
Valued at 1c per lb	0·4c per lb	45.97	25 p. c.	25.00	19.03
Valued at from 1c to 16c per lb	0·4c per lb	42 00	25 p. c.	25.00	17.00
Vained at above 16c.	0 7c per lb	30.27	25 p. c.	25.00	5.27
Wire—					
Rivet, screw, fence and other forms, incluodiog flat for fencing, valued at 3c or less	0·6c to 3c per lb	32.87	30 p. c.	30.00	2.87
Flat steel wire	60 p. c.	50.00	30 p. c.	30.00	20.00
Wire, galvanized	1¾c to 3½c per lb	71.55	30 p. c.	30.00	41.55
Wire rope, iron	2½c to 4c per lb	58.93	30 p. c.	30.00	28 93
Wire rope, steel	3½c to 5c per lb	69 12	30 p. c.	30.00	29.12
Wire cloth and netting	3½c to 5c per lb	60.33	30 p. c.	30.00	30.3
Wire cloth and netting, galvanized	4½c to 5c per lb	60.33			
Cast-iron.					
Cast-iron vessels, plates, stove plates, etc	1.2c per lb	50.00	25 p. c.	25.00	50.00
Malleable castings	1¾c per lb	30.28	25 p. c.	25.00	5.28
Cast hollow-ware, coated, glazed or tinned	8c per lb	49.98	30 p. c.	30 00	18.98
Chains	1.6c to 2¼c per lb	44 35	30 p. c.	30.00	14.35
Iron or steel sheets, glazed orenameled	45 p. c.	45.00	35 p. c.	35.00	15.00
Iron or steel sheets, glazed in colors	50 p. c.	50.00			
Cut nails and spikes	1c per lb	90.00	25 p. c.	25.00	65.00
Horseshoe and wrought-iron oails	4c per lb	51.09	25 p. c.	25.00	26 09
Wire nails	2c to 4c per lb	48.79	25 p. c.	25 00	23.79
Spikes, horseshoes, wrought iron	1.8c per lb	48.79	25 p. c.	25.00	23.79
Cut tacks, brads	2¼c and 2¾c per 1000.	48.79	25 p. c.	25.00	23.79
Aluminum, crude and alloys	15c per lb	20.00	15 p. c.	15.00	5.00
Antimony	¾c per lb				
Argentine, or German silver, unmanufactured	25 p. c.	25.00			
Brass, in bars, pigs or clippings	1¼c per lb	15.43	10 p. c.	10.00	0.43
Bronze powder	12c per lb	36.11	30 p. c.	30.00	5.11
Bronze or Dotch metal	8c per pkge	104.43			
Copper ore	¼c per lb	6.17			
Old copper, clippings, etc	1c per lb.	13.68			
Regulus of copper and copper cement	1c per lb.	10,62			
Copper plates, bars, ingots, nnmanufac'd	1¼c per lb.		30 p. c.	30.00	
Copper rolled plates, sheets, rods and copper bottoms	35 p. c.	35.00	20 p. c.	20.00	15.00
Lead—					
Ore and dross	1½c per lb	19.55	15 p. c.	15.00	4.55
Lead, in pigs and refuse	2c per lb.	69.33	1c per lb.	29.91	29.92
Lead, in sheets, pipes, shots, etc	2½c per lb.	50.57	1c per lb.	20.32	30.25
Metallic mioeral substances, crude and unwrooght metals	20 p. c.	20.00			
Mica	35 p. c.	35.00			
Nickel—					
Nickel oxide and alloy	10c per lb	21.84			
Peos, except gold	12c per gross	44.77	35 p. c.	35.00	14.77
Penholder tips and gold pens	30 p. c.	30.00	25 p. c.	25.00	5.00
Pins, inclodiog hair and hat pins	30 p. c.	30 00	20 p. c.	20 00	10.00
Quicksilver	10c per lb	21.38			
Tin, black oxide of, bar and block tio	4c per lb				
Zinc, in blocks or pigs	1¾c per lb	34.27	20 p. c	20.00	14.27
Zioc, in sheets	2½c per lb.	35.20	25 p. c.	25.00	10.20
Zinc, old and worn, for remanufacture	1¼c per lb.	26.70	16 p. c.	15.00	11.70
Miscellaneous articles of iron, steel, lead copper, nickel, etc., not specially enumerated	45 p. c.	45.00	35 p. c.	35.00	10.00
SCHEDULE K.—SUNDRIES.					
Coal—					
Bituminous & shale	75c per ton	22.67			
Slack or culm	30c per ton	33.35			
Coke	20 p. c.	20.00			
Fulminates	30 p. c.	30.00	30 p. c.	30.00	
Gunpowder and Explosives—					
Valoed at 20c. or less per lb	5c per lb.	25.54	5c per lb.	25.54	
Valued at more than 20c	8c per lb.	3.85	8c per lb.	8.36	
Precious Stones—					
Cut, but not set	10 p. c.	10.00	15 p. c.	15.00	
Set	25 p. c.	25.00	25 p. c.	25.00	
Bend or belting leather	10 p. c.	10.00	10 p. c	10.00	
Alabaster, amber, catgut, coral, jet, spar	25 p. c.	25.00	25 p. c.	25 00	

Part of articles placed on the free llst are: Amber, unmanufactured. Antimony. Articles of growth, produce and manufacture of United States when returned after having been exported, without having been advanced ln value or improved in condition. Asbestos, unmanufactured. Asphaltum and bitumen, crude. Bismuth. Blue vitriol, or sulphate of copper. Bullion, gold or silver. Charcoal. Chromate of iron or chromic ore. Clay—Common blue clay, in casks, suitable for the manufactnre of cruclbles; clays or earths, unmanufactured, not specially provided for. Coal, anthracite, bituminous, and shale, and coal, slack or culm. Coke. Coal tar, crude, and all preparations and products of coal tar, not colors or dyes, not specially provided for. Cobalt and cobalt ore and oxide of cobalt. Coins, gold, silver and copper. Copper, imported in the form of ores. Old copper, fit only for manufacture. Regulus of copper and black or coarse copper and copper cement. Copper ln plates, bars, ingots or pigs and other forms not manufactured. Copperas, or snlphate of iron. Diamonds and other precious stones, rough or uncut, including glaziers' and engravers' diamonds, not set, and diamond dust or bort, and jewels to be used in the manufacture of watches or clocks. Emery ore. Feldspar. Fossils. Glass, broken, and old glass which cannot he cut for nse and fit only to he remanufactured. Hones and whetstones. Iridium. Iron ore, including manganiferous iron ore; also the dross or residuum from burned pyrites and sulphur ore, as pyrites or sulphuret of iron in its natural state. Magnesia, sulphate of, or epsom salts. Magnesite, or native mineral carhonate of magnesia. Magnesium. Magnets. Manganese, oxide and ore. Mica and metallic mineral substances in a crude state, and metals unwronght, not specially provided for in this act Minerals, crude or not advanced in value or condition by refining or grinding, or hy other processes of manufacture, not specially provided for in this act. Nickel, nickel oxide. Ocher and ochrey earths, slenna and sienna earths, umber and umber earths, not specially provided for in this act; dry. Ores of gold, silver and nickel and nickel matte. Paraffin. Phosphates, crnde or native. Plaster of paris and sulphate of lime, unground. Platinum, manufactured, and vases, retorts and other apparatus, vessels, and parts thereof, composed of platlnum for chemical uses. Plumbago. Potash, crude, carbonate of, or "black salts.' Caustic potash or hydrate of, including refined in sticks or rolls. Nitrate of potash, or saltpeter, crude. Sulphate of potash, crude or refined. Chlorate of potash. Murlate of potash. Quicksilver. Salt in bulk and salt in bags, sacks, barrels or other packages, but the cnverings shall pay the same rate of duty as if lmported separately, provided, that if salt is imported from any conntry which imposes a duty upon salt exported from the United States, then there shall be levied, paid and collected upon snch salt the rate of duty now provided by law. Soda, nitrate of or cubic nitrate, chlorate of and sulphate of, or salt cake or nitre cake. Sodinm. Stone and sand, burr stone ln blocks, rough or mannfactured, or bound up into millstones, cliff-stone, unmanufactured; freestone, granite, sandstone, limestone and other building or monumental stone, except marble, unmannfactnred or undressed, not specially provided for in this act; pumicestone, rottenstone and sand, crude nr manufactnred. Sulphur, refined, lac or precipi-

tated, and sulphnr or brimstone, crude, in bnlk, snlphnr ore, as pyrites, or sulphnret of iron in lts natural state, containing in excess of 25 per cent of sulphur, and sulphur not otherwise provided for. Sweepings of sllver and gnld. Tin ore, cassiterite, or black oxide of tin, and tin in bars, blocks, pigs, or grain or granulated.

The Big Trinity County Ditch.

The following excellent description of the big ditch of the La Grange Hydraulic Gold Mining Company, ln Trinity county, is from the Weaverville *Journal:*

When ln the fall of 1892 Mr. Fred Beandry of Colorado, anticipating unfavorable action to silver by Congress, turned his attention to "gold mlning," and, incidentally hearing of the extensive deposits of gravel in Trinity county, he at once determlned to examine into their merits more fully, and, wlth a mlning experience of 35 years in the States and Terrltories to guide hlm, he came here last winter after having investigated a nnmber of fine properties in Wyoming, New Mexico and Arizona, as well as other sections of this State. After carefully testing several fine properties, he decided to purchase the property of the Trinity Gold Mining Company, located chlefly on Oregon mountain and gnlch, snme three miles northwest nf the town of Weaverville. It is therefore due to Mr. Beaudry's energy and good judgment that a new era has been inaugurated in this county, as by his influence a large amount of forelgn capital has been invested in gravel mines, resulting in upward of $200,000 in cash, belng actually expended since the first day of August last, in the way of betterments and the cnnstruction of a dltch, which latter will rank among the finest hydraullc enterprises ln the State.

Associated with Mr. Beaudry in this enterprise is Baron Ernest de La Grange of France, who, with the former, deserves much merit for carrying on the enterprise, as these two gentlemen are practically the owners of the stock, having advanced all the money out of thelr own means and forming a close corporation of the La Grange Hydraulic Gold Mining Company, which is incorporated under the laws of the State of Colorado, with a capltalization of $5,000,000, shares of par value of $1 each, full-paid and nonassessable.

In the face of apparently insurmountable obstacles these gentlemen, who are respectively general manager and president of the company, and in spite of the many predictions that the ditch would be a failure, after a careful survey by Messrs. W. S. and H. L. Lowden, mlning and and clvll engineers, determined to go ahead with the construction of the ditch, and on July 27th the contract was let to Messrs. Rouse & King, an experlenced firm of contractors from Colorado, who undertook to complete the work by the first of next December.

The ditch, which is taken out about 11 miles above the mouth of Rush creek, a fine and perennial stream of large and ample capacity, has a length of 15 miles; its course is for the first two miles sontheast, thence southwest, and it runs along the foot of Bally mountaln and its precipitous spurs, terminating on the summit of Oregon mountain. At the initial polnt on Rush creek there is a tunnel 225 feet long, 5 feet by 7 feet in size. Next comes a tunnel of 148 feet under "Snow-slide creek," while another of 156 feet passes nnder Coal creek, one of 804 feet through the divide of Brown's and Little East Weaver creeks and one through the divide of Sydney gulch and West Weaver creek 785 feet ln length, or a total of 2118 feet of tunneling, part of which through hard rock will give an idea of the magnitude of the work. These tunnels have a grade of from ¾ lnch to 1 inch to the rod, and the 804-foot tunnel is timbered almost its entire length with heavy and substantlal timbers, resting nn heavy sills and well mortised.

Nearly seven-elghths of the entire ditch is in rock work; the banks have a slope of one to three, and a grade of 144 feet to the mile, while the dimensions are seven feet at top, four and one-half feet at bottom and four feet deep, the carrylng capaclty belng 3000 inches or 60 cublc feet per second of time.

There is about one mile of dltch lined with one-lnch boards, and there are six flumes, six feet wide and four feet deep, constructed of 8x10-inch sills, 4x6-inch posts, and caps and sides and bottom out of 1½x2-inch lumber, the flumes measuring 290, 95, 32, 148, 92 and 210 feet respectlvely in length.

There are substantial waste gates every mile along the line of the ditch, six feet wide and four feet deep, and in order to avoid rock and snow sllides the dltch is covered at different polnts along its conrse, to the extent of some 5000 feet, with boards and planks, so as to prevent sllides from filling up the ditch, some 250,000 feet of lumber belng used ln the latter's construction.

Decldedly the most interesting features of the ditch, however, are at East Weaver and West Weaver creeks. At the former, ln order to avoid abont two and one-half mlles of rough and very expensive rock work, a pipe line was constructed, measuring 28 inches in dlameter and 1681 6-10 feet in length, with a depresslon of 400 feet, while at West Weaver the diameter of the pipe is 26 inches and length 2260 feet, the depresslon being 540 feet, whlle the construction of five miles of very difficult ditching has been avoided thereby at this point.

The plpe is Nos. 4 and 8 steel. At each of the inlets of the pipes there is a tank provided, 22 feet long, 12 feet wlde and 9 feet deep, canstructed ln a very substantlal manner with 2-loch plank and 6x10-inch and 6x12-inch timbers, whlle at the bridges the sill timbers measure 18x20 lnches square, and the spans over East and West Weaver creeks measure respectively 65 and 85 feet, being heavily trussed, and securely anchored and bolted to solid rock foundatlons. The lnlet of the East Weaver pipe line is 60 feet above the level of the ontlet, while that of the West Weaver ls 150 feet above the outlet, thus affording a large pressure for discharge at the latter, which are provided wlth ample outlet boxes so as to prevent washing or damage to the ditch.

The inlets are protected wlth guards, preventiog any large objects from entering the pipe, and automatic air valves are fitted on the upper portlon of the lnlet, to prevent the pipe from collapsing in the event of accidents, should the water be drawn suddenly from the pipe from any unforeseen cause.

Manholes are also provlded at different points to permit examination of the pipe from the inside, if necessary; in fact, all the lmprovements known to modern hydraulic science are applied to insure efficiency and safety in operatlng the ditch.

The weight of the columns of water in these immense pipes is tremendous, but the construction of the bridges and extra heavy gauges of steel used in the pipe and fine workmanship on the same is a sure guarantee of their ability to stand the pressure for many years tn come. The difficultles in excavating the trenches on hillsides at an angle of from 30 to 45 degrees, and mostly in rock, must be seen to be properly appreciated.

The pipe is coated throughout, inside and outside, wlth an extra fine quallty of asphaltum; and, having been pumped full of water, the gauges show 170 and 200 pounds pressure to the square inch respectively, nnt a seam or joint showing a slgn of leakage, being perfect in every respect.

The LaGrange Company ls also making extensive improvements in fitting up the mine, employing some 30 men for that purpose and expending some $15,000 to $20,000 in that dlrection alone. This work is in charge of O. M. Loveridge, Esq., an old placer miner of some 25 years experience, and his assistant, C. E. Goodyear, who has been associated with the former during the past ten years.

The reservoir is being enlarged to about 2½ acres, a large amount of new ditching, using about 100,000 feet of lumber for new flumes and blocks and some 4500 feet of 15, 18 and 22 inch steel pipe, ls also being added to the 2000 feet already in use; and last, but not the least, two latest improved glants of six and eight-inch nozzles with an 18-inch inlet have been added, making the equipments of this property first-class, complete and second to none in California.

As the pressure will be 300 feet, lt will be seen that the capacity and duty of the water will be lmmense, and that the ample supply of water now assured the company by means of its new ditch will insure economical removal of the gravel at a mlnimum of cost. The dumpage facilities of the gravel banks are the very best to be found in the State.

The contractors have employed from 300 to 400 men steadily since the 1st of last August, have purchased nearly all thelr supplies from local dealers, and deserve much credlt for the energy displayed by them in pushing the ditch to completion, the character of all their work being first-class in every detail.

When completed, the ditch will cover about 5000 acres of aurlferous gravel, and the LaGrange Company own now, including their nriginal purchase, 3000 acres of some of the richest gravel in the county. It is an exceedingly valuable property, certalnly one of the richest in the State, and with good management—whlch is assured the company under Mr. Beaudry—there is no reason why it should not pay handsome dividends for many years to come. Every detail of the work has been done under Mr. Beaudry's experienced supervision.

The long-dlstance transmisslon of power was first bronght prominently before the public by the experimental line constructed between Lauffen and Frankfort two years ago. The power of the Lauffen Falls was converted lnto electricity, transmitted 115 mlles to the Exposition at Frankfort and there operated a number of motors. The distance was beyond the limits of commercial success, but it demonstrated the possibillty of the system. To-day plants are in operation and transmitting current for light and power at Walla Walla, Hartford, Portland, Pomona and Tellnride. The distances vary from four to thirteen miles.

Explosions in Coal Mines.

At the annual meetiog of the British Association held at Nottingham last month, Prof. H. B. Dixon opened a discusslon on the above subject wlth special reference to the dust theory. The question, he said, was one that had attracted very great attention, aod mining engineers had shown themselves ready to welcome and make use of the results of the researches of chemists and others. Explosions in mines were attrlbuted to two substances—fire-damp and coal-dust. That fire-damp and air could produce disastrous explosions was known, and many investigations had been made on the rate of transmission of the explosion and other points. Many held that mixtures of coal-dust and air were explosive and a source of great danger, whlle others contended that while such a mlxture was inflammable, it was not explosive and the flame died out after traveling a short distance. Another vlew was that if air containing fire-damp, in quantlty even too small to be detected by the ordinary method, should in any way become mixed with fine coal-dust the mixture was highly explosive and dangerous. As early as 1864 it was held that coal-dust might be a source of explosion if set on fire by an explosion of fire-damp, and in 1870 to 1875 many small explosions took place in France, which were attributed to the explosive properties of dust alone. Vital showed that a blown out shot might raise a cloud of coal-dust, and that if this dust were very dry and fine it would explode, the violence being greatly increased by the presence of fire-damp. Galloway, ln 1876, made experiments that led to the concluslon that coal-dust mixed with air was not inflammable *per se*, but became explosive when mixed with one per cent of fire-damp. Later experiments, however, led him to the conclusion that certain kinds of coal-dust were explosive when mixed wlth air alone. The great explosion at Seaham Colliery was in all probability mainly, if not entirely, due to coal-dust, since the explosion did not travel along those galleries in which there was no dust, or where the floor was damp. This explanation was, indeed, the only one that was in agreement with all the facts. Reference was made to the experiments of Sir Frederick Abel, which seemed to show that a mixture of fire-damp and air was inflammable in presence of non-combustible dusts, such as fine sand. In 1882 the Chesterfield commlttee came to the conclusion that, although mixtures nf coal-dust with air alone were inflammable, there was little or no concussion, and the flame did not travel any great dlstance. The combustion of dust alone was never of an explosive character, but the presence of coal-dust was capable of greatly increasing the explosibility of small quantltles of fire-damp. A Prussian committee, in 1887, practically confirmed Galloway's results, and also found that the use of what are called high explosives might give rise to dust explosions. These conclusions were disputed by a French committee, and Mallard and Le Chatelier contended that dust and air, though inflammable, were not explosive, and did not become explosive, unless mixed with more than five per cent of fire-damp. These results were not ln accord with those of other observers. An Austrian committee came to the same conclusions as Galloway and the Prussian commlttee, but pointed out that different coal-dusts differed greatly ln inflammability, and attention should be glven to the nature of the explosives used for blasting, and especially to the character of the fuse. The statement that explosives did not travel through damp parts of a mine was confirmed, and it was recommended that explosives should be localized and isolated by always keeping certain sections of a mine damp. Recent experiments by Mr. Hall showed that different coal-dusts varied enormously in their degree of inflammability, and that mixtures of some dusts with alr were violently explosive if lgnited by means of a large flame, snch as that produced by a blown-out shot or by a small explosion of fire-damp. The great variation in the properties of coal-dusts probably accounted for the difference between the reports from different dlstricts. Whether it was true that coal-dust and alr alone were explosive, or that the presence of small quantities of fire-damp was essential, must be shown by further investigations on the nature of the dust from different mines, the methods of detecting very small quantities of fire-damp, the degree of danger attachlng to the use of different explosives, and the efficiency of various methods of laying the dust ln mines by waterspray, etc.

THE famous stage ride of Horace Greeley with Hank Monk, of which so much has been said and sung, will be commemorated in Nevada's exhibit at the Midwinter Fair by the presence of the old Concord coach which Doc Benson of Tahoe vouches for as being the identical vehicle in which Horace was taken through "on time."

Mechanical Progress.

Metal Cross-Ties on Railroads.

Speaking of metal railroad ties generally, it may not he amiss to recall the fact that they owe their origin to French thought, haviog been proposed some 30 odd years ago by the French engineer Vautherin. Little was done, however, with the early Vautherin sleeper, since it was soon found to but inadequately meet the requirements of actual service, and to increase rather than decrease, as iotended, the expense aod trouble of track maintenance. About 700 of the ties were laid on one of the small German railroads in the year 1867, hut were replaced after a short time by the conventional wooden variety. In 1874 new experiments were made on the same line with somewhat thicker metal ties. About 25,000 of them were put down, and in the main proved quite satisfactory, some of them being probably still in place, so that the trials on the whole may be said to have been successful. Since 1877 the number of metal tie designs has grown apace, and for several years past there has been an embarrassing variety from which to choose, each type of tie of course being claimed to be the best by its designer, while few of them could boast of actual time-trled performance as a fair measure of worth. Probably the best results abroad with metal ties have been obtained with what is known as the Heindl tie, which has been in continued successful use for about ten years on several German and Austrian railroads. None of the defects of frequent fracture of the ties themselves and of rapid deterioration of the road-bed on which they are lald—defects which are said to have been prominent on some lines where they were used, notably in Belgium—have there been observed, and the conclusion has heen reached on these lines that the superiority of the metal tie over the wooden one is definitely established. On one of the Austrian railroads—the Kaiser Ferdinand Northern—a strictly comparative series of trials were made on a long length of road, and extended over the full period of nearly ten years above noted, two parallel sections of line being equipped, one with the Heindl ties and the other with ordinary wooden ones. The traffic conditions on both of the sections were practically identical; the expense records, which were carefully kept, showed, as the result of the several years of observation, a materially decreased expense account for the metal tie section. At the same time the metal ties, after the full period of use, were found to he still practically as good as new, while the competing oak ties were in a much deteriorated state, notwithstanding the fact that they had been treated with chloride of zinc, ao admittedly excellent preservative.—Cassier's Magazine.

Length of Tubes.

Boiler tuhes determine in a great measure the length of the boiler, the diameter of the tube being the determining factor, when we are after greatest economy, says the *Tradesman*. It is considered good practice to make the tube length about 48 to 50 times the tube diameter, and so with four-inch tubes for soft coal we would have tubes and boiler about 16 to 18 feet long, and this will give greater economy than when it is shorter. A longer boiler will also decrease the efficieocy, as the heat will have been pretty well extracted from the tubes by the time the flame and gases have passed through 16 feet of four-inch pipe. After this the heat should be used for heating feed-water or superheatiog steam.

For hard coal the tubes are usually made smaller and the boilers are shorter in consequence, the increased number of tubes giving the additional heating surface, and the smaller tube usiog up the heat (if it can be so stated) sooner than in the case of the large one. These little things go to make up the efficient design of a boiler and should be well studied by those interested in boiler design.

It is not safe to assume all of the heating surface of the tubes as efficient in making calculations (unless they are spaced further apart than usual); and if we do we are apt to overrate the capacity of our boilers, which is not good practice, as then they are more apt to he forced beyond their capacity in order to come up to the rating.

With small tubes it will be hest to allow 15 square feet of heating surface to a horse-power; but for large tubes, amply spaced, it is only necessary to allow 12 feet of heating surface to the horse-power.

Testing Steam Gauges.

It is very much to be feared that but very few steam gauges are correct throughout the whole range of the scale, as they will vary more or less at different pressures, says *Machinery*. In testing a gauge to ascertain its correctness, it is always as well to make the pressure at which steam is usually carried the most important point to he determined. A gauge may be all right at low pressure, and not right at higher pressures, and the reverse may be found, especially with gauges that have heen in use for some time. By many it is not considered advisable to use a gauge for recording pressures as high as that shown on the dial, for few springs will stand such an extension without hecoming permanently set, to a certain extent, and especially is this the case with the cheaper gauges. It is not a difficult matter to devise means for comparing with a test gauge, as any kind of force pump will serve the purpose, and in the absence of a special pump the boiler feed pump can bs utilized. Gauges can he tested by fitting them to a piece of lead pipe, a gauge at either end, the pipe being bent to hring the gauges vertically. The pipe should be filled with water, and then inserted between the jaws of a vise, when screwing upon the vise will bring pressure to bear on both gauges. This is, perhaps, as convenient a way as any, providing the lead pipe can be obtained, for in the absence of a vise a lever can be applied which will serve a similar purpose. An occasional test of a gauge should be made, if its indications are to he relied upon, and it is better to keep the pressure gauge in good order, and be certain that it records correctly, than to depend on the safety valve, whether of the lever or spring type, for these, also, are liable to improper working, if not given proper attention.

New Form of Writing Telegraph.

Donald Murray, a journalist of Sydney, N. S. W., has devised a form of writing telegraph based on the typewriter, says *Engineering*. The message is printed by type keys both at the transmitting and receiving ends. One line is used hetween the instrument, in spite of the fact that so many different characters can be transmitted and printed at the far end of the wire. Clockwork and synchronizing devices are not used; but the depression of a key at the sending end transmits along the wire five short positive and negative currents. At the receiving end of the line is an interpreter, which, according to the particular combination of signals sent, releases one or the other of a number of contact keys, which operate relays working the type keys.

Ancient Girders.

It has been proved that iron T-girders were nsed by the Romans in construction before the Christian era. Some tons of broken T-girders of that metal were found a few years ago during the excavation of the great *cella soliaris* of the baths of Caracalla in Rome. These girders had been cased in brooze, and they were arranged so as to form square panels, which were filled in with concrete, decorated with mosaic and delicate stucco relief, colored and in gilt, thus forming a strong and richly decorated flat ceiling, with a span of great width.

The Latest Plate-Glass Machine.

It is stated that the Pusey & Jones Co., Wilmington, Del., have just completed a new plate-glass rolling machine for the patentee, J. W. Bonta, of Scranton, Pa., which, it is expected, will be very effective in the manufacture of plate glass. According to a recent description, this machine consists of a very strong iron bed or carriage about 15x40 feet in dimension, mounted on car wheels and arranged to move over tracks laid in front of the melting and annealing furnaces used in glass works. Above this carriage, and moving on friction rollers, is a bed or table nearly as wide and ahout one-half as long as the carriage, which in operation moves rapidly from one end of the carriage to the other. The movable bed is composed of two very solid and perfectly level plates lying with the level surfaces together, one-half lying on the friction rollers of the carriage and the other supported at its center by hubs projecting from housings at the center and one end of the carriage. One of these hubs is attached to a lifting nut and screw fixed in the center housing; the other is the hub of a big worm wheel carried by a similar nut and screw fixed to the end housing. By operating these lifting screws the upper half of the bed is raised or lowered at the will of the operator. When it is lifted the lower half can he sent under the roller to the forward part of the carriage and is ready to receive the molten glass. When the glass has heen poured on the level surface of the hed thus exposed, it can be shot back under the roller and under the suspended half of the bed. This is at once lowered until it rests upon the rolled surface of the glass; the two plates are locked together, raised and reversed so as to bring the unrolled surface of the glass up, are again separated so as to expose this unrolled surface, aod the glass is again sent under the roller.

Scientific Progress.

Antidote for Mercurial Poison.

Those who are interested in meteorological instrument factories and other industries in which mercury is extensively employed will rejoice in the discovery of an effective antidote for mercury polsoning, says the *Optician*. Mercury and its compounds are universally known to have a most injurious influence on the human system, and the shake, the shortness of hreath, the slckening pallor, the llstlessness and semi-stupefaction of operatives who are daily subjected to its fumes are sadly familiar. Much has been done to improve the health of the workmen by means of ventilation and improved machinery and pumps, but still the evil exists to a serious extent. Slight cases are usually and quickly cured hy change of air or of work, but if not taken in time the trouble may end fatally. It is not always, however, that a workman can afford either to take change of air or turn his hand to a new employment, and here the new remedy comes in.

Some four years ago one of the partners in a large Parisian incandescent lamp manufacturing firm became salivated while experimenting with mercury pumps, and he cured himself completely by means of small doses of iodide of potassium dissolved in milk. He next administered slmilar doses to some workmen in his lamp factory, who were suffering from mercury poisoning, and they qnlckly and completely recovered. In his present factory, into which he moved a year ago, there has not been a single case of salivation, and this exemption is attributed to the fact that doses of the lodide have been continuously administered to the workmen. Men from other factories have been taken in who on entering exhihited the characteristic signs of mercury poisoning, and who recovered forthwith. The dally dose supplied by the firm to each man is 25 grammes of the crystallized salt dissolved in about 400 cubic centimeters of milk. It has heen suggested that an improvement in practice would be to increase the dose in snmmer, when cases of salivation are much more frequent, and to diminish it during the cooler months of the year; but the present method appears to meet all requirements, and the distressing malady is now robbed of its terrors. We have mentioned meteorological instrument factories in this connection, but it seems to be a moot point, both with masters and men, whether mercurial poisoning is possihle under the condltions in which mercury is here used.

Why the Smoke from the Bowl of a Pipe is Blue and That from the Mouth, Gray.

Smoke, says London *Tid Bits*, consists of minute particles of solid or liquid matter suspended in the air, and its color depends partly upon the chemical constitution of such particles, but also largely upon their size. Exact experiment has shown that as the size of minute particles suspended in air is gradually increased, they give rise to colors varying from sky blue down through the whole range of the spectral scale. This is the cause of sunset and sunrise colors in the sky. Its effects can also be traced in the case of the two kinds of tobacco smoke, modified hy the murky tints of the carbonaceous products. The smoke given off from the heated surface of the burning tohacco in the bowl of the pipe consists of matter, all of which has been highly heated and very fully oxidized and decomposed. It consists mainly of exceedingly small solid particles, exhlbiting by virtue of their smallness a blnish color. On the other hand, that smoke which has been drawn through the tobacco into the mouth of the smoker carries with it a relatively large quantity of water and hydrocarbon, which are condensed upon the solid particles above mentioned. The relatively large size of such particles explains the well-known grayish color of the smoke which issues from the mouth of the smoker.

The Sense of Taste.

Strictly speaking, with the tip of the tongue one can't really taste at all, says the *World's Progress*. It you put a small drop of honey or of bitter almonds on that part of the mouth, you will find, no doubt to your great surprise, that it produced no effect of any sort; you only taste it when it begins slowly to diffuse itself, and reached the true tasting reglon in the middle distance. But if you put a little cayenne or mustard on the same part, you will find that it bites you immediately—the experiment should be tried sparingly—while if you put it lower down in the mouth you will swallow it almost without noticing the pungency of the stimulant. The reason is that the tip of the tongue is supplied only with nerves which are really nerves of touch, not nerves of taste, proper; they belong to a totally different main branch, and they go to a different center in the brain, together with the very similar threads which supply the nerves of smell for mustard and pepper. That is the way the smell and taste of these pungent substances are so much alike, as everyhody must have noticed; a good sniff at a mustard pot producing almost the same irritating effects as an incautious mouthful. When one is trying deliberate experiments on the subject, in order to test the varying sensitiveness of the different parts to different substances, it is necessary to keep the tongue quite dry, in order to isolate the thing you are experimenting with, and prevent its spreading to all parts of the mouth together. In actual

practice this result is obtained in a rather ludicrous manner, by blowing upon the tongue between each experiment with a pair of bellows. To such undignified experiments does the pursuit of science lead the ardent modern psychologist.

Freaks of Memory.

There are on record many remarkable cases of loss and subsequent recovery of memory, says the *World's Progress*. Dr. Abercromby records the case of a four-year-old boy who was injured in the head and underwent trepanning. On recovery the boy absolutely forgot all about the accident and the operation, and when he had reached the age of fifteen had a fever, during which he gave his mother an exact description of the operation and of every one who was in the room at the time, even to the very clothes they wore. In the intervening ten years the subject had never been referred to by the boy, even in the slightest way.

The story is well known of the aristocratic English boy, Montague, who, stolen when a child, was brought up as a chimney sweep, and, being one day employed to sweep the chimneys of his ancestral halls, descended through the flue into his own former nursery, recognized everything in the room, and made remarks which led to the restoration of his birthright.

After Sir Walter Scott had completed the "Bride of Lammermoor" he had an illness, and on recovery he was given a printed copy of the work. "Why," said he, "who can have written this? I had intended to handle this subject myself." Nor could he recognize any paragraph in the story.

An office-holder, whose position was practically a sinecure, his entire duty being to sign his name, happened on one occasion to have to sign so many documents that toward the end of the task he literally forgot his name, and could not for the life of him continue to write it.

An attache of the German army at St. Petersburg went out one morning to make a round of social calls, and on his going into a house where the servant, not knowing him, asked for his name in order to announce it, the diplomat forgot it, and had to turn to another visitor for aid. This ludicrous predicament had something of a parallel in the case of Sir Henry Holland, who spent several hours exploring a mine in the Hartz mountains, and, getting faint from fatigue, forgot every word of German, in which he had been conversing with his guide. Sir Henry could not recollect enough German to make the request that he be taken out of the mine, and not until he came to the surface and enjoyed a good lunch did he recover his command of the language.

Dr. Dwight tells of a girl who preached a sermon while asleep, and mentioned a date when she would deliver another discourse. On awakening she knew nothing about it, yet upon the exact date she had fixed she again preached in her sleep.

The familiar instance of Mezzofanti, who, after a long illness, forgot everything except the use of his native language, is another remarkable example.

Sir Walter Scott's hero, Guy Mannering, came back, as we know, to the scenes of his early boyhood, and was so reminded by what he saw of a forgotten past that he said things which caused his recognition as the long-lost heir.

To turn to the lower animals, a story is told by Sir Robert Clayton, who put out to grass at Knavesmire, in Yorkshire, an entire troop of cavalry horses, part of a regiment disbanded after its return from the continental wars, intending to let the animals pass their remaining days in peace. One day a violent storm came up, and loud peals and vivid flashes rent the air. The old war horses ranged themselves side by side with the same ranks they should have formed had the scene been the battlefield and their masters in the saddle ready for the fray.

Curiosities of Science.

The weight of a molecule of hydrogen, as given by an eminent authority, says the *Chemist and Druggist*, is approximately 0.000,000,000,000,000,000,000,04 of a gramme; multiplying this inconceivably small number by 55, the atomic weight of iron, the weight of a molecule of iron is ascertained — 0.000,000,000,000,000,000,000,002,2 gramme. In the sulphocyanide test we are able to detect the presence of thirty-three ten-millionths of a gramme of iron; dividing this number by the weight of one molecule of iron, we find that this apparently delicate test is unable to indicate to our senses a less number of molecules than 1,500,000,000,000,000.

Do Ants Talk?

A writer in the *Magazine of Natural History* asks whether ants talk, and relates that he saw a drove of small black ants moving apparently to new quarters. Every time two met they put their heads together as though they were chatting. To investigate the matter he killed one, and the eye-witnesses of the murder hastened away and laid their heads together with every ant they met. The latter immediately turned back and fled.

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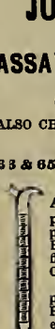

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Useful Information.

Air and Consumption.

A writer in the *Century* recommends deep breathing with arm exercise as a preventive of consumption. There is no doubt as to the efficiency of this course, for consumption, except in imported cases, is unknown in high altitudes, the air being so light that deep breathing is mechanical. Few of us use our lungs to their full extent. The practice of trades and callings that require close attention has given to many of us a slight stoop and a falling forward of the shoulders that confines the lungs, while the lack of robust exercise to stimulate the physical mechanism leads to a faint panting that goes nowhere near chest deep and that continues in sleep. We cannot all be soldiers, sailors, hunters and blacksmiths, but most of us can straighten up at our work now and again and give the starved lungs a full drink of air. Exercise, except in some incidental way, such as the mountain climber, the fisherman or the sportsman encounters in pursuit of his hobby, is so tiresome that few can persevere in it. Sparring and kicking at the atmosphere, bending and reaching at nothing, require more than ordinary courage and method to continue for more than a week. It may be all right in theory, but in practice it is a tedious nuisance. An occasional full breath involves no hardship and puts the body to no strain, and probably the results are as efficient as much exercise.

One fertile cause of consumption, and perhaps, if statistics were obtainable, the most fertile of all causes, is the breathing of stale air. Our shops and offices are poorly ventilated, and our homes, particularly in winter, are worse. There are housewives to whom sunlight is poison and fresh air is dangerous. They go about their parlors in a twilight, breathing the peculiar mustiness of carpets and upholstery that they save from fading at the cost of their health and that of their families, and they grow bleached and yellow and twice as susceptible to ailment as those who live a more normal life. If it were not for broken windows and rickety doors in city tenements and out-door occupations by day among the farmers, the ravages of phthsis—foolish spelling, that!—would be much worse than they are; for there are thousands of people who shut themselves into their rooms at night as hermetically sealed as may be. The smell of those rooms in the morning, charged as the air is with animal exhalations, is horrible.

A strange and wholly unaccountable notion prevails among such people, who are usually of the illiterate class, that night air is unhealthy, so they collect a few cubic feet of day air in their bedrooms and breathe it over and over again until it is fairly rotten. The continuance of life under such conditions is a marvel. Night air is the same as day air, except that it is cooler and fresher, and with the subsidence of industry it has less of gas, dust and smoke in it than the air of noon. It is, therefore, the fittest air to breathe that there is, and he who denies it to his lungs at night denies one of his greatest needs and invites the speedy corrosion of his lungs. Thus it is that in farming districts, where rugged health ought to prevail, we see stooping shoulders and pale faces and hear rasping coughs. Let the air in everywhere; let us have more of it in our places of work, let us have more of it in our theaters, especially let us sleep in it. Breathe it heartily to the bottom of the lungs, and there will be no more consumption.

Origin of the Fan.

The origin of the fan in China is said to have sprung from the following incident: A royal princess, very beautiful, was assisting at the feast of lanterns, her face covered with a mask, as was usual. The excessive heat compelled her to remove it, and in order to guard her features from the common gaze, she moved it quickly to and fro in front of her face, thus simultaneously hiding her charms and cooling her brow. The idea was at once adopted throughout the kingdom. Catherine de Medici carried the first fan from Italy ever seen in France, and in the time of Louis XIV the fan, covered with jewels, was worth a small fortune.

The First American Glass Works.

It was only 116 years after the discovery of America that the first glass works was established in the colonies, says the *Popular Science Monthly*. It was a modest venture in an industrial way, but one to which much importance is attached, since it was the starting-point in that interesting history which it is the purpose of the present paper to outline, and still more because it was the first industry started by Europeans on American soil. It thus heads a list which is to-day certainly as long as human needs, and almost as long as human desires. It is a list which has been nearly three hundred years in making. This was in the year 1608. The pioneer glass house was a part of the activities at Jamestown. The spirit of the London Company was distinctly commercial. It had gold and silver in mind as the ultimate goal, but, with a prudence characteristic of British enterprise, it had also an eye to nearer and smaller profits. The plan of colonial manufacture was meant to serve this end. On the second voyage of Captain Newport eight Poles and Germans were sent over for the express purpose of making glass, pitch, tar and soap ashes. The glass house was out in the woods, about a mile from Jamestown. It was a crude affair, but it seems to have been the center of considerable activity, for when the ship returned to England in the following year "a trial of glass" was among her cargo. The glass was presumably exported in the form of common black bottles, for the state of the art in those days and the limited time would scarcely have allowed the evolution of anything more difficult of manufacture. The progress of the glass industry in America has been far from constant. It has suffered severe and violent fluctuations amounting almost to annihilation. Several times it has needed to be born again. But the sum total of these successes and vicissitudes has been the establishment of an industry which, while it is the oldest, is also at the present time one of the most promising and most highly developed of all our industries.

Salt Water Street-Sprinkler.

The practice has become quite prevalent at English seaports to use salt water for street-sprinkling, and the method and result are pronounced very satisfactory. At Yarmouth, which has a population of about 50,000, the salt water is pumped by a gas engine, driving a pump of about 25,000 gallons daily capacity into a tank at a considerable elevation, whence it is delivered through a special system of distributing pipes, nine miles long and three to seven inches diameter; these pipes are of cast iron, coated inside with a preservative compound. The total consumption annually has been 5,000,000 gallons for street-watering, at a cost of five cents per thousand gallons, being a considerable saving over the expense of the same work when fresh water was used; the statement also is made that during the summer months the dust is kept under by the adhesive qualities of salt in the water, and if the surface coating formed by the salt is removed by sweepers at the appearance of the first, no disadvantageous effects can be traced to the use of salt water. At Birkenhead it is found that one spread of salt water on the surface of the street or road proves equal to about three spreads of fresh water, as the latter evaporates under the heat of the sun, whereas the crust on the surface left by salt water keeps down the dust for a considerable length of time. In another locality the report of the engineer claims that one load of salt water goes as far as three of fresh in that place; and in various other towns, where this system has once been put to the test, it has been adopted as one possessing special advantages.

Why Ice Cream is Sometimes Poisonous.

Not long since I was conversing with one of the largest manufacturers of glue and gelatine in the country, when, in illustrating and explaining another matter, he chanced to make an interesting statement in relation to sickness occasioned by eating ice cream, says the *Sanitary News*. I believe that I shall violate no confidence in repeating the substance of what he said, which was, that much, if not most, of the sickness referred to was caused by the use of glue containing some form of antiseptic. The use of gelatine to prevent ice cream from losing form and melting down rapidly is desirable, and even necessary, and were good gelatine, such as is prepared for food purposes, employed, no objection could be raised. But close competition and the greed of gain tempt manufacturers of the cream to buy glue at a less price as a substitute for gelatine. The cream makers are usually ignorant that antiseptics (which are nearly all poisonous) are frequently employed by glue manufacturers to prevent decomposition of the very perishable materials from which the glue is made. The cream maker does not usually state that he wants the glue for making into ice cream, and so the seller has no opportunity to warn or advise, and the cream maker uses the glue and wonders it makes people sick.

Seasoning Oak.

Oak is one of the timbers that requires extra care in seasoning, as its sap ferments and heats more quickly than the sap of any other wood, says the *American Cabinet Maker*. The logs should be sawed as quickly as possible after being cut, or at least after warm weather sets in. It has been noticed that the sap exudes to a considerable extent after the planks are sawed, and that it dries, forming a gummy surface, which, to a considerable extent, prevents the action of the air upon the interior sap.

To overcome this, experiments have been made by putting the planks into swinging crates and sinking them in running water so they are entirely submerged. After they have been in the water two days they are removed and stood upon end under a shed, where they are well protected from the sun and rain, and where there is a good circulation. In this position they dry without warping, and much more quickly than when piled up in the customary manner, and when seasoned the color is uniform.

The Thrifty Japanese.

What is the reason that Japan has no poverty problem? One reason is probably to be found in the land system, which has given to every worker a holding and encouraged him to supply his wants by his own labor. Another reason lies in the national taste for country beauty. Nowhere else are parties formed to visit the blossom trees, and nowhere else are pilgrimages simply for the sake of natural beauty. A country life has, therefore, its own interest, and men do not crowd the cities for the sake of excitement. There is, too, in Japan, a curious absence of ostentatious luxury. The habits of living are in all classes much the same, and the rich do not outshine the poor by carriage, palaces and jewelry, the rich spend their money on curios, which, if costly are limited. Rich and poor are alike courteous. It is not possible to distinguish employer from laborer by their behavior; all are clean, all are easy, all are restrained.—Fortnightly Review.

Electricity.

A New Thermoelectric Phenomenon.

It is stated in many text-books, and pretty generally known, that electric currents may be produced by heating a single metal, if there be any variation in temper, or if the distribution of heat be very irregular and the changes of temperature abrupt, says W. Huey Steele, M. A., in *Science*. These effects are generally supposed to be exceedingly small compared with ordinary thermoelectric effects, but some experiments performed by the writer in the Physical Laboratory of the University of Melbourne show that at high temperatures these effects are sometimes exceedingly large, as great or greater than that given by a junction of antimony and bismuth at the same temperature. At low temperatures this is most apparent in iron wires, iron being the only metal in which I could observe the effect at a temperature below 100°C. If a piece of iron wire be put in circuit with a very sensitive galvanometer and gently heated irregular currents will flow, sometimes one way, sometimes the other, rising and falling in an apparently arbitrary manner. I several times observed the effect simply by warming the wire with my fingers. At a red heat the effect is much more marked and also much more irregular. The effect in iron, however, is not so great as in some other metals at a high temperature, the highest effect I observed in it being .002 volt. Altogether twelve different metals and four alloys were examined and the effect noticed in each of them. In order to raise them to a high temperature without breaking circuit by their fusing I put them through clay tubes (tobacco pipe stems), and when examining metals with low melting points I completely filled up the tube with the metal. A tube of lead when heated gave, after a little irregular heating, .3 volt, and another, with a lead wire passed through it and heated about the middle, gave about half that amount, but in this case there was no irregular or unsymmetrical heating. The effects are not always steady, in fact they very seldom keep steady, but they may be observed with certainty by filling a tube with lead and raising it to a red heat in a Bunsen flame. The effect may also be observed very easily in fine gold wire, but it does not last so long as that in lead, which shows no sign of ceasing after an hour's or half a day's heating. With gold I observed a higher effect than with any other metal, once observing nearly half a volt. Three-tenths volt was observed with six different metals—lead, copper, gold, tin, zinc and antimony—while with others, *e. g.*, silver and aluminum, though I could certainly observe the effect, it was exceedingly small. Sometimes when a metal is heated thus the changes in the electromotive force generated are slow and gradual and at times scarcely perceptible, while at others they are rapid and sometimes apparently instantaneons at a time when the temperature is perfectly steady and nothing is apparent which could cause the changes. Another curious effect is that sometimes when the temperature is falling, after the gas has been turned down or put out, there are rises, generally sudden, in the e. m. f.; this was chiefly noticed in lead. These phenomena are generally quite sufficient to mask the ordinary thermo electric effect at a red heat, and thermoelectric tables are consequently quite unreliable for high temperatures.

Who Invented the Lightning Rod?

An English Assyriologist recently announced that he had unearthed a furnace thousands of years old, in which the hot blast had undoubtedly been used. Just as this archæologist seeks, rightly or wrongly, to deprive Neilson of the credit of his invention, so the German Egyptologist, Herr Heinrich Brugsch, endeavors to prove that

Benjamin Franklin was not the devlser, but merely the rediscoverer of the lightning conductor, as he claims that he has abundant testimony that the ancient Egyptians used a form of this useful instrument for protecting their temples against discharges of atmospheric electricity.

Lighting by Reflected and Direct Rays.

Four inverted arc lamps were tried by John F. Aspinall in one of the Lancashire and Yorkshire Railway workshops at Horwich, says Benjamin A. Dohson, where, however, owing to the great hight at which they had to he fixed, they were not successful. They have since been placed in the large drawing offices, and the light for drawing purposes is as perfect a light as can he. Failing, on acconnt of the height of the workshop, to arrive at a satisfactory result with the solely reflected light, Mr. Aspinall has succeeded in lighting the main machine shop with ordinary open arc lamps, each protruding through a whitewashed disc formed of light boardings framed together. A curious combination is thereby produced of lighting by the reflected and direct rays. It is not the whole of the advantages of the reflected light, because the eye has a tendency to glance upward toward the dazzling arcs, and shadows are projected. Nevertheless, the writer is convinced that by this combination of reflection a gain has been achieved of at least 25 per cent over the ordinary direct arc lighting without reflection; and all concerned are satisfied with the result.

The Purity of Gold.

The purity of gold is estimated by an Abyssinian weight called a carat,· Arabian quirrat, a bean, the fruit of the carah tree, which is subdivided into four parts called grains, says an exchange. The term carat when applied to gold and silver is not a weight unit, but the mode of expressing the purity and fineness of the metal in twenty-fourths. Thus 18-carat gold is metal in which eighteen parts out of twenty-four (or three-fourths) are pure gold. This method of estimating fineness is traceable from the marc of Europe having been divided into twenty-four-real carats or actual weight units. The present method is to estimate fineness in thousands; *i. e.*, gold fine has 250 parts alloy, corresponds to 18-carat gold, three-quarters of the metal being pure gold in each case. Our gold coins are 21.19.

A Caution.

One should always have close beside the bed at night a candle and a box of matches. If there is occasion to take in the night a dose of medicine—nervine, an oplate or a tonic—never take it in the dark. One may be perfectly certain mentally of the place where the bottle or the box was located when his attention was last called upon the thing, but in the meantime a maid intent upon clearing up or the mistress herself may have made a change. It is not safe to snatch at freedom from pain in the dark, and cases not a few are on record where people have made irremediable blunders, finding out too late that what they supposed an innocent remedy was a deadly poison.

A Novel Pencil.

A novel lead pencil has been invented by an Eastern man. · The pencil is covered with narrow strips of specially prepared paper, run on coils, and so arranged that by releasing one end of a coil with a pin or the point of a penknife a strip of paper can be reeled off, leaving the pencil with a cone point and about one-eighth of an inch of an inch of lead uncovered. The company proposes to cover lead, crayon and slate pencils in the same way. The pencils are painted in fancy colors, and so closely wrapped around that the seams in the paper are said to be invisible.

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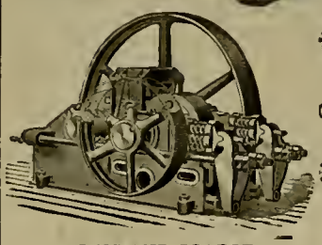

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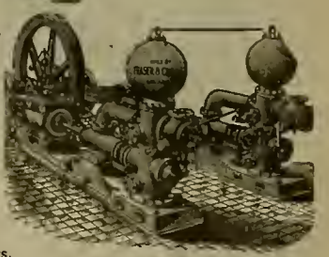

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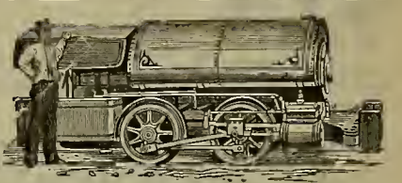

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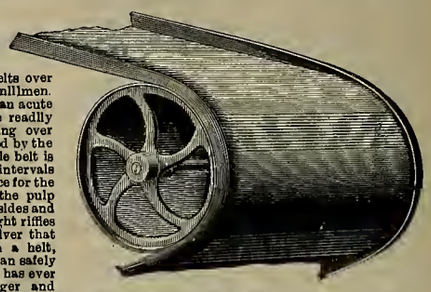

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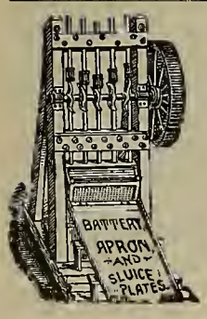

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Coast Industrial Notes.

—N. D. Rideout announces the sale of his interest in the California State Bank of Sacramento to a local syndicate.

—An enthusiastic mass meeting was held at the Opera House at San Diego recently to devise plans for helping along the construction of the first ten miles of the San Diego and Phœnix Railroad.

—The Northern Pacific terminal shop employes and car-builders have decided to accede to the 5 and 10 per cent reduction in wages, their organization not being thorough enough to resist at present.

—San Bernardino citizens are signing a petition urging the Board of Supervisors to submit to the voters of the county a proposition to issue bonds in the sum of $250,000 for the purpose of improving public highways.

—Articles of incorporation of the Payette Valley and Northern Railroad Company have been filed at Boise City, Idaho. The company proposes to run the road from some point near Payette to Moscow or Lewiston, and other branches are also being provided for.

—The California representatives in Congress have received letters from the Pacific Pine Lumber Company of San Francisco requesting them to use their influence to prevent the placing of logs on the free list as raw material. The petitioners claim that logs are not raw material.

—At a special meeting of the Justice Mining Company last week, R. P. Keating was elected superintendent, vice Charles Lyons. The company is to go ahead and open up the mine, and a test run of ore of about 200 tons is to be made, after which the company will either lease or buy a mill and do its own crushing.

—A pipe-line scheme to supply Sonoma county towns with water is projected. The undertaking contemplates the construction of a water system having its source near Ukiah, Mendocino county, and which will extend from that point to Cloverdale, thence to Healdsburg, thence to Santa Rosa, thence to Petaluma, and from thence on to San Rafael.

—The Davis sawmill, at Pine Ridge, Fresno county, has been burned. The mill, valued at $20,000, and more than $25,000 worth of lumber, were destroyed. There were also several spans of the Pine Ridge flume burned, besides a few private bunches of lumber which had been sold and not removed. The total loss is about $50,000, with only $10,000 insurance.

—The Idaho State officials have been made cognizant of preparations on the part of a Michigan syndicate to secure a large tract of timber land recently surveyed in Shoshone county. The survey includes 80,000 acres of the finest timber land in the United States, and was made at the instance of the State authorities. The plan is to secure men to settle on the lands as bona fide settlers and afterward sell out to the syndicate, by which scheme they hope to secure valuable timber for their private gain.

—The Pioe Ridge flume, in Fresno county, has been completed. It is 52 miles in length, extending from Stevenson creek, at an elevation of 500 feet, to Covis, on the Pollack Railway, 12 miles from Fresno, at an elevation of 400 feet. The flume in its construction surmounts many engineering difficulties, and for 12 miles is double, carrying 300 cubic feet of water per second for irrigation. This will bring 40,000 acres of new land under water. Many million feet of lumber will come down the flume annually.

—The pioneer ship of a Japanese coal fleet has arrived at this port from Kuchinotzu. She is the British ship Aigburth, and made the passage in the smart time of 33 days. Other vessels, coal-laden and consigned to E. C. Evans, agent for the Japan mines, and on the way, are the American schooner Puritan, the American bark Mt. Washington and the British ships Bandaneira and Lord Downshire. Some of the coal is in pressed bricks, but the most of it is destined to enter into competition with the cheaper grades of coal prevailing here.

—The Bear Valley Company, which has a capital stock of $4,000,000, and has heretofore paid 15 per cent annual dividends, and which supplies Highland, North San Bernardino, Redlands, Alessandro, Moreno and Perris with water for irrigation purposes, has, during the recent money stringency, been attached in sums of thousands of dollars due for work and material furnished in extending irrigation canals and pipe lines to new districts during the past summer. F. P. Morrison of Redlands has been appointed Receiver by order of the Superior Court.

Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Butte.

THE BULLION.—Forbestown *New Era*: The Bullion Mining Company is making rapid progress on their mill. They now have about a dozen men at work hewing and getting out timbers. They expect to have their mill completed and running about the middle of January. Mr. Kimball is engaged with a crew of 20 men running a branch ditch from the main ditch to supply this mine and the Denver with mill power.

Calaveras.

LEDGE DISCOVERED.—Murphys Cor. *Citizen*: Some little excitement exists on the grade below Murphys, owing to the fact that a quartz ledge has been found in close proximity to the road. The discoverers or relocators are J. A. Black and Mr. Stimezer, both of whom have prospected in this section for some time past. The lode they are opening up is about four feet in width, and is of a very pretty character, being completely filled with very pretty sulphurets, and being of the ideal "blue ribbon" quartz. An assay of the sulphurets has been made by Assayer Smythe of the Utica works at Angels, and the result was sufficient to greatly encourage the owners to push work as fast as possible. Both gentlemen have but small means, but have shown a willingness to develop the mine as rapidly as they can under the circumstances.

SHUT DOWN.—West Point Cor. *Citizen*: The Hard Lead Mining Company have shut down their property for a couple of weeks. The Hard Lead has been quite famous of late. Since the present company took charge of this mine it has yielded fine ore, some paying high.

THE CENTRAL HILL MINES.—*Chronicle*: The gravel mine owned by the Gold Bros., which has recently been opened by a Sacramento company, is looking fine. A tunnel 260 feet in length has been run into the channel, and the gravel prospected shows a paying mine. The improvements already on the mine consist of a blower to take the powder smoke out of the tunnel and a trestle 100 feet long to dump the gravel into the mill, which will soon be erected. F. Gold of this place has been engaged to put up the mill and a number of other buildings.

The Merrimac, Monitor and several other mines in this vicinity will soon be in operation.

Los Angeles.

NUGGETS FOUND.—A dispatch from Pasadena says: A couple of miners down from the mountains were in town exhibiting gold nuggets which fairly bristled with the precious ore. Between them they had fully $100 worth of gold in nuggets and dust, which they claim to have worked out of a mine recently located by them in the mountains north of this place. Just where the mine is they refuse to state, but claim there is plenty of gold in sight. They came down on account of the snowstorm, but will secure provisions and return at once. Whether there is anything in the story or not is hard to tell, but rumors of big finds in the mountains have been floating around for some time, and it is possible that the men have made a big hit, as they claim. Old miners have long claimed that there is gold, and plenty of it, in this range of mountains, the mineralogical conditions being such as to furnish this idea, and that it will be only a question of time until some one strikes the lucky vein. The mine which was recently discovered near the Lowe Mountain Railway by Mr. Dickey, which promises to produce some excellent paying ore in large quantities, lends color to these predictions. The discovery of some well-paying gold fields in the vicinity at present would prove very acceptable and be of great benefit in the development of southern California.

Modoc.

QUARTZ VEIN UNCOVERED.—It is reported that a rich quartz vein was discovered by a prospector named Layton, near Willow ranch, in Goose Lake valley, last Thursday, says the Alturas, Modoc county, *Herald* of November 27th. The new discovery adjoins the Candlestick mine, owned by J. A. Barnes. Free gold can be seen with the naked eye all through the quartz.

Nevada.

STRUCK RICH GRAVEL.—*Transcript*: Richard Ellison and Henry Tremaine, who have been running a tunnel on Selby Hill for a long time, struck rich gravel the other day. The indications are that they have tapped the main channel which runs up the ridge from the old Nebraska, and which was immensely rich when that company worked it many years ago.

AT THE EAGLE BIRD.—*Transcript*, Dec. 7: The new owners of the Eagle Bird mine at Maybert have started work. After getting the water all out, men will be put to work sinking the shaft 300 feet deeper. Everything about the hoisting works and mill is being put in good shape, and the company are doing things in a systematic manner.

AT ROUGH AND READY.—The future of Rough and Ready promises to rival the activity of the early days when mining had a most successful boom. From J. F. Schroeder of that burg the *Union* learns that the Osceola mine, owned principally by Messrs. Schroeder and Hunt ress, and the Central Pacific claim, owned by John Fippin, were bonded yesterday to Oakland men of means who will at once commence active work on quite a big scale. Six mines—the Prince, owned by Dunstan Bros. of Grass Valley, Mistletoe, Moss Ledge, Central Pacific, Osceola and Grant—have been working on a moderate scale, employing a few men for some time, but many more men will be given employment in the near future in several of them. The ore in the Rough and Ready district is not free-milling, but must be treated by the smelting process to yield much of a profit. Experiments by this method quite recently prove this statement, which fact, being known, will probably result in the opening up of a number of new claims.

Placer.

IN GOOD SHAPE.—Placer *Herald*: The drift mines east of Rocklin are showing up in good shape. Since the irrigation season closed and water has been available for power, the Harlow mine has started up again under the direction of Dr. Barton, and our information is that it is paying big. At present it is working some eight or ten men. The Leahy mine, near the Harlow, is also at work and reported as doing well for its enterprising owners.

SURVEYING RESUMED.—Colfax *Sentinel*, Dec. 8: E. C. Uren and a crew of six men again resumed surveying for the line of the South Yuba ditch on Tuesday morning. They commenced near Hayford's crossing, and at present are below New England Mills. They will survey as far down as Clipper Gap. A crew of seven men were put to work Monday morning, digging the ditch near Cape Horn Mills. Before long a much larger gang will be put on, and the ditch pushed to completion as rapidly as possible.

Plumas.

AT THISTLE SHAFT.—*National-Bulletin*, Dec. 7: On Tust, August Holtz, foreman of the Thistle Shaft drift mine near Gibsonville, arrived in Quincy. At the present time about 50 men are employed. This is owing to the small supply water at this season of the year. When there is a plentiful supply of water to wash all the gravel extracted from the big channel, the company employs from 80 to 100 men.

PROSPECTING AT SPANISH PEAK.—*National-Bulletin*, Dec. 7: Geo. Morton, W. H. Bradford and others have located a large tract of mining ground at Spanish Peak, covering the old Monte Christo claims. It is their intention to prospect them next spring. During the past season Mr. Morton did sufficient prospect work there to convince him that there is a big gravel mine in the mountain, and he and his associates propose to make an effort to find it.

Riverside.

A THRIFTY CAMP.—Governor Blasdell is building up quite a little settlement around the Santa Rosa mine, near Perris, and it gives promise of becoming a good-sized, thrifty camp, says the *New Era*. The mill is working night and day, and a large amount of ore is being crushed. Ore is being taken out of the north drift in the mine and it mills well.

San Diego.

GOOD RESULTS.—The Nuevo *Sentinel* states that the Ready Relief, probably the best mining property in San Diego county, has been yielding splendid results for the owners, and at the present time a large quantity of high-grade ore is in sight. The Ella mine requires no comment. It will be remembered that in May $7000 in gold was taken out, the result of two months' work by three men. There is to-day on the dump a pile of ore estimated to contain from $10,000 to $12,000 in gold, all taken out of the mine in the past three months.

Sierra.

EIGHTY TONS OF MACHINARY.—*Mountain Messenger*, Dec. 8: The largest mining enterprise ever inaugurated in Sierra county is now under good headway. During two weeks past upwards of 80 tons of mining machinery has arrived in this city for the mine, which is known as the Mt. Moriah, and is situated on the old emigrant road above Alleghany and Forest City, about 30 miles from Nevada City. Upwards of 45 tons of the machinery has been forwarded to its destination by team, and there are about 35 tons at the depot now awaiting shipment. A portion of it was loaded on two freight wagons last evening and started for the mine to-day. On Saturday a dispatch came from the mine requesting two barrels of lime and some cement to be shipped through by private conveyance with all possible haste to Freeman's Crossing, where a fresh team would be ready to take the freight to the mine. Con. Grissell secured a thoroughbrace wagon, and with four of his best horses hitched to it, started off with the freight yesterday morning and expected to make the trip by 10 o'clock last night. It has been impossible to secure freight teams here, else all the machinery would have been on the ground before this time. This new enterprise is controlled principally by Eastern capitalists, and the way they are rushing the work of erecting hoisting works, mill, etc., is just paralyzing to mining men. The mine is a good one and the company propose to get some of the bullion out of it as soon as possible. Other quartz properties in that section are to be opened up.

STARTED THEIR MILL.—The *Mountain Messenger* learns that the Bonanza Gold Mines (limited), near Sierra City, have started their mine and have most excellent prospects. A fine prospect has been obtained in all parts of the mine and the ore worked is now paying $8 per ton.

Siskiyou.

AN EXTRA FORCE. — The Greenhorn Blue Gravel Company, says the Yreka *Journal*, has put on an extra force since the commencement of the rain-storms and expect to realize a greatly increased gold yield. Prior to the storm $500 a week was the average, with only two pickmen at work in the pay drift, with others prospecting in new drifts from the main tunnel.

FOR THE FAIR.—Yreka *Journal*, Dec. 13: Large quantities of fine-looking specimens of quartz have been received in Yreka lately as specimens for exhibition at the San Francisco Midwinter Fair. Every section of the county will be represented, as specimens are received almost every day. The Schroeder mine on Deadwood mountain sent several specimens to Manrioe Renner last week, one block weighing about a hundred pounds, showing gold in great quantities to the naked eye. Specimens have also been received from Humbug creek, Klamath river and Scott valley, all of which yield rich pay in milling.

Last week we were shown a handsome nugget of gold and quartz worth about $20, which H. W. Howland picked up while working in his claim on Spring gulch, Yreka Flats. Yreka Flats in the '50 period was exceedingly rich, and whenever new ground is touched, good pay is certain—in fact much of the ground has been worked two or three times with profit, and is likely to be worked again as soon as plenty of water is obtainable without too much cost.

David Henry, an old-time miner of this place, writes us from Trinidad, Colo., about his belief that good diggings exist on the South Umpqua river in southern Oregon. He says he went from Wallamette valley to Yreka in the fall of 1854, driving a herd of beef cattle belonging to Henry Owens. Crossing the South Umpqua on the old wagon-road, there is a fall of about four feet, making a kind of rapids. About 20 steps below these rapids, he saw considerable gold on the bedrock. As the waves receded, they carried the light sand away, leaving the bedrock exposed. He picked up two pieces of smooth gold, one weighing two grains, and he firmly believes there must be good diggings farther up that stream. Mr. Henry was a miner for one year on Greenhorn and for seven years on Humbug.

E. F. Staples, the manager of the quartz mill and mine at Hungry creek, Siskiyou mountain, has about 14 men at work at present, and runs a night shift. He expects to get out a great quantity of quartz during the present winter, so as to keep the mill going steadily during next spring and summer, and also during the winter unless heavy snowstorms prevent.

Sonoma.

TO DEVELOP PAINT MINES.—Articles of incorporation have been filed at the County Clerk's office of the Indian Metallic Paint Company. The incorporation papers recite that the purposes of the company are to locate, mine, sell and manufacture into paint metallic ores in Sonoma and other counties of the State. The capital stock is stated at $100,000 and there are 100,000 shares of stock. The directors of the company are John Bliss, M. D. Merritt, Jacob Palmer, Vernon Wilson and John Wilson, all of Oakland, and that city is named as the principal place of business. In a number of places in Sonoma county, notably at Occidental and Pine Flat, ochre has been found in large quantities, and preparations have been made to mine it on an extensive scale and manufacture it into paint. Near Occidental there are hundreds of acres containing ochre-bearing veins.

Tuolumne.

THE ARBONA.—*Independent*, Dec. 8: The Arbona mine, near Tuttletown, is having a trial crushing at the Joe Hampton mill, and judging from the plates, the rock will prove payable—from $5 to $6 per ton will probably be the result, although we should be pleased to hear that it will go over our estimate.

The Rawhide still continues to take out the same class of rich ore, but what is most satisfactory, the rich shoot has been tapped at the 500 foot level.

The Alameda is north of the Rawhide 3000 feet. It was purchased this week for $18,000, $1000 being paid in cash, the balance in one year—a very low figure considering its well-known value. W. A. Nevills was the purchaser for a San Francisco company.

The Crystaline mine is crushing and taking out good rock—getting richer as developments proceed. The late rains gave them more water at the mill. This property is developing into a very valuable mine. Tellurium is now seen in the rock.

In the App mine rich rock is being daily extracted from levels 700 and 800. Everything is running smoothly and prosperously, and the future of this valuable mine is assured. Several others at or around Quartz Mountain will be started up shortly, while a decided boom has set in, in that locality, the App having given a general impetus to mines on the mother lode at this point owing to the late rich discovery.

At Belle View prospecting still continues in the above mine. The work to the north at the 300-foot level, has been abandoned for the present, while the work now in progress is to the southeast at this depth. The contract for the 100-foot level is nearly completed, but as the vein looks well the superintendent has written to the company in San Francisco, to drive another 100 feet. He thinks that within this distance good, payable quartz will be found.

At Black Oak the mine is looking bright and prosperous. The shaft is at present 650 feet in depth, and when 30 feet farther is gained a level will be run to the north. The vein at the bottom of this shaft is six feet in width, and is heavily charged with gold, galena and sulphurets. The great abundance of galena makes it necessary to save the largest pieces for a separate process. The mill is not running owing to improvements. New plates and blankets will arrive from the East in a few days, together with new steel shoes and dies, and when these are put in work will be resumed.

The Lanra is down about 300 feet, and when 400 feet is reached, a level will be run to the north, for the Little Carlotta, which is about 100 feet distant, and the North Star 600 feet from the Laura. As neither wall is in sight, the width of the vein is not known. Three shifts are employed, working day and night.

Eureka consolidated resumed work last Tuesday. The late rains increased the water supply

so that everything is running again in full blast.

The Seminole, near Sumnereville, has commenced crushing on a good batch of rock, and will receive good and faithful attention from O. Mason, at whose mill the rock is being worked.

Mr. A. Patterson and son lsft Sonora this week for the Ham & Birmey mine, on which property they will construct a ten-stamp mill, which speaks well for the future prosperity of that mine.

The Santa Maria mine is located on the Yosemite road, and near Crocker's station. Area 1500x600 feet. One hundred and fifty thousand dollars has been extracted, on or near the surface. The deepest sinking on the whole mine does not exceed 100 feet deep, besides three tunnels and a numher of open prospecting cuts. No. 1 tunnel is situated on the east eide of the mountain, which is a partial crosscut and is entered 150 feet. The vein was tapped at 50 feet from the entrance. The rock paid all through $30 per ton; frrther a winze was sunk from the floor of this tunnel, 50 feet on vein, which paid $50 per ton, free gold, the sulphurets have a value of $1800 per ton. No. 1 tunnel on west side was drifted on vein 200 or more feet. Rock paid from $40 to $200 per ton in free gold. Thie was known as the old Gilson tunnel. The vein was stoped to surface, hacks of about 40 feet was worked. No. 2 tunnel on west side is known as the low level and ie entered about 150 feet, where the vein was interaected. The vein at this point is from 20 inches to two feet, with very heavy eulphuretted ore, of from eight to ten per cent of very high grade. There is an abundance of water for steam purposes, likewiee timber and firewood for all time. There is a Huntington mill on the mine with a 10-horse power engine and boiler which has a capacity of 10 tons per day. The mine is in a good condition for immediate work, and rich rock can he taken out right away, without any outlay for repaire of any kind. The mine is owned by Messrs. Neale and Crocker.

NEVADA.

Washoe District.

THE NORTH BONANZA.—Virginia *Chronicle*, Dec. 7: Superintendent Dave Crosby of the North Bonanza mine yesterday started the mine up for a trial run. Mr. J. W. Pearson, the well-known mining man, who was in Virginia for several days recently, was here for the purpose of getting the affairs of the company in ahape. Men have been put to work in the face of the main tunnel, where the ledge has been opened, and 100 tons of ore are to he mined for immediate milling. The ore ie to be milled by Colonel Boyle at the Dazet mill in Silver City, and, if the returns juetify it, the mine will be opened up on an extensive scale and regularly operated. The mine ie located at the mouth of Six-mile canyon, and the ore will he hauled to the mill at Silver by Tom Barton's teams. The hauling and milling can be done for $6.50 per ton.

Superintendent Crosby states that, if the returns from the ore milled are favorable, the company will probahly engage Fisher's mill, which is near the mine, to do the crushing. He has confidence that the mine can be worked at a profit, and expects that it will soon form one of the regular industries of this region.

A SHAFT BREAKS.—*Chronicle*, Dec. 11: Operations were suspended at the Con. Virginia last night by the breaking of the iron shaft in the flywheel on the engine. The hreak was diecovered by the engineer at about 7 o'clock, and operations were brought to a halt and the afternoon shift of miners, who were at work, removed from the mine. The break was close to the flywheel, between it and the pinion or small cogwheel, and across the shaft. The shaft did not break in two, but it was rendered useless and unsafe hy a big crack in it. To-day workmen were at work taking the broken shaft out of the wheel, and another shaft was being prepared at the McCone foundry. The new shaft will probably be in place by to-morrow or the day after. Opsrations will, no donht, be resumed by Thnrsday at the latest, and things be going along the same as ever. The accident will set the West Con. repaire and the excavation of the Rule drift back a little, but not enough to speak of.

SUMMARY OF COMSTOCK OPERATIONS.—In the Consolidated California and Virginia mine the sonthweet drift (the Rule drift) from the 1000-foot station of the Con. Virginia shaft has been advanced during the week 60 feet; total length, 90 feet; face in soft porphyry and clay. On the 1650 level in the vicinity of the winze, at a point 20 feet down, there have heen extracted during the week 91 carloads of ore—ahout 20 tons—the average assay value of which is $31.60 per ton. In the Ophir mine, on the 1465 level, the west crosecut from the main north drift has been extended to a total length of 246 feet, and the face is in porphyry and clay. On the 1465 level of the Mexican mine the eouth drift from the top of the upraise, 45 feet above the eill floor, is in 51 feet, and the face is in porphyry, clay and quartz of low valus. On the 900 level of the Union shaft the joint north drift running from the joint west drift at a point 1520 feet west from the shaft has heen extended during the week 18 feet; total length, 277 feet; face in porphyry and small streaks of clay and quartz. In the Andee mine the west crosecut on the 420 level has heen stopped. No changes are reported in the eaet crosscut.

In the Beet & Belcher mine the east crosscut on the Con. California and Virginia line on the 900 level ie out 136 feet. The face is in porphyry. In the Hale & Norcross mine on the 1300 level they continue stoping out ore from the winze below this level, and extracted during the week 33 cars of ore, assaying $34.87 per ton per car sample, and 19 cars of ore, average assay per car eample $18.57 per ton. In the Yellow Jacket mine during the week they extracted ahont 100 tons of ore from the raise above the 1100 level. The average aesay valne of car samples was $37 per ton. In the Kentuck Con. mine on the 1100 level the west crosscut from the south lateral drift has heen extended eight feet and then stopped. The crosscut passed through five feet of fair grade ore and they have started to drift south in the ore. They have also atarted an upraise from the north crosscut in ore of fair quality. In the Occidental Con. mine from the west ledge above the 400 level they continue to extract ahout 10 tons of ore per week of the average assay value of $48 per ton. The west crosscut, started at a point 75 feet helow the 300 level, is now in 160 feet and continues in porphyry with seams of quartz. They milled during the month of November 92 tons of ore and slums, and produced bullion valued at $1498.

TO RESUME WORK IN ALTA.—*Territorial Enterprise*, Dec. 10: Superintendent Boyle is authority for the statement that operations will he reeumed in the Alta mine next month, unless the directors of the company should change their present intentions, which is not at all likely. Colonel Boyle says there is a large body of lowgrade ore on the upper levels of the mine that will pay operating expenses, and that exploratory work may lead to the discovery of higher grade. The ore referred to is on and above the 930 level and that is the point where work will begin. The Sutro tunnel connects with the Alta workings at a depth of 1050 feet helow the eurface, but the water level of the mine is in the vicinity of the 1300 level. The Alta mill is in good repair as well as the hoist plant, and all that is necessary to resume work is to put fires under the boilers. The mill is equipped with 15 stamps and concentrators, adding materially to the perceutage of bullion returns from the ore, some of which carries a small percentage of hase metal.

Devil's Gate District.

PRODUCING PAY ORE.—*Territorial Enterprise*, Dec. 8: The Haywood mine is steadily producing fair-grade ore, of which there is apparently an inexhaustible quantity in the mine. The Haywood is considered one of the best properties in Devil'e Gate district and has produced a quarter of a million in bullion. Col. Qninn is the principal owner.

W. Naleigh, the veteran prospector, and H. Smith are getting some ore out of a location near the Occidental.

The Oest mine is sending ore to Taylor's mill, and the owners will probahly make a $10,000 clean-up for Novemher.

The ore cut in the Zadig tunnel will probahly be sent to the Rock Point mill. When the tunnel is completed it will prove as important for draining the mines of Devil'a Gate district as the Sutro tunnel is to the Comstock. The Zadig tunnel, when completed, will admit of the mines connected with it heiug drained to a depth of 200 feet below the present workings.

There is but little work in progress at the Red Jacket. There is said to be pay ore in the mine if it is economically conducted.

Prospectors are at work on various other locations industriously seeking for ore and frequently find pockets the proceeds of which pay them handsomely for their labor.

Palmyra District.

AN ALUM MINE.—An alum mine has been discovered in Palmyra and Indian Springs district, Lyon county. The *Times* says samples which have heen analyzed contain 72 per cent of alum of the following composition: Alnmina, 22.19; soda, 17.30; sulphur acid, 13.38; water, 30. The claim has not been prospected to any great extent, but the indications are that there is a hig deposit of the material. It lies within six miles of the C. & C. railroad and can be put on the market at reasonable rates. It has heen decided to ohtain a quantity of the alum for an exhibit at the Midwinter Fair in San Francisco.

White Cloud District.

THE COPPER MINES.—Supt. Geo. L. Fitzgerald is giving the ores of the company's claims in White Clond district, Humholdt county, a thorough test, says the *Era*. He expects to he occupied in the laboratory for the greater part of two weeke more, hy which time he will have formed a good idea of the general richness of the lode and smelting properties of the different ores of copper in the canyon.

No. 1 tunnel has cut into the Red Oxide vein, which has an immense outcrop of iron containing copper. The men have encountered a cave, and among the eoft formation, which is falling, rich copper ore is fonnd. The progrees of thie tunnel is watched with anxiety, for the workmen may at any moment get into an extensive body of peacock ore. Eminent mineralogiets, who have examined the lode, have etated that as depth ie attained large bodies of copper will be encountered, and, if snch proves correct, the strength and width of the veins justify the aesertion that the company own as extensive and valuable a copper property as ie known to-day.

C. A. Hitchcock, who made a conditional sale of the mines to the New York Company, is a man of much mining experience. Before taking the property in hand he went carefully over the ground, taking eamples from here, there and everywhere along the lode, and a general average of the same tested had made him an enthueiast and inspired him with the opinion that not only would the iron give place to the copper as depth was reached, but that even the croppings, hy an economical process, could he reduced at a profit; and apropos it may be of intereet to state that five and six per cent copper is mined at a profit in Arizona and Montana.

Captain E. B. Wilder of Salt Lake City, who has had a mining experience which in terms of years there are none to compare in this conntry, pronouncee the property a most valuable lode, and asserte that by proper mining large ore bodies should be uncovered with but small outlay. Captain Wilder had charge of a somewhat similar group of mines in Cuba 30 years ago, which netted the owners fortunes.

ARIZONA.

PLACER DISCOVERY.—*Enterprise*, Dec. 7: Another placer discovery has heen made in southern Arizona which will do much to place it in the foremost line of gold-producing sections before very long. Thie time some Mexican prospectors discovered in Yuma county, near the Pima county and Sonora lines some gold fields which are reported quite rich. The placers are reported to he miles in length and width. A prospector named Grijalvas discovered a ledge in the same vicinity which is 2 to 3½ feet wide, composed of honeycomh quartz or spar, which shows free gold in large quantitiee. Specimens have been received at this office which leave no douht that there is plenty of yellow metal where they come from. The Mexicans who are at work on the placers have brought in considerable of the gold and have disposed of it to banks and stores.

SHUT DOWN.—*Herald*: The Harqua Hala mine and mill have closed for ahout two months, or until the new shaft is completed so the ore that is extracted in the mine can be taken out of the new shaft, the mine being in a dangerous condition near the old shaft. It will throw about 100 men out of employment that worked in the mine. The wood-choppere and haulers will continue on with their contract.

LARGE OUTPUT.—*Silver Belt*, Dec. 9: The Old Dominion Copper Company is makiug a large output of copper, and while the production for 1893 will hardly eqnal last year's fignres, owing to the suspension last summer, yet a portion of the loss will be made up. Two 42-inch furnaces have been continuously in blast for several months and are making a splendid record. In one day last week the output was 41,133 pounds copper. The new auxiliary wind-box recently placed on the furnaces has proven of great utility, effecting a considerable ssving of fuel and permitting of the furnaces heing run continuously, whereas formerly two or three hours were lost daily. The weather is favorable to the prosecution of all kinds of surface work and to teaming, and coke is coming in and copper going out with pleasing regularity.

NEW PUMP, ETC.—Mohave *Miner*: A triple-action pump for use in the G. A. R. mine, White Hills, was sent out Thursday morning.

Work is being continued on the Man mine in Todd Bssin. The tunnels now being run in on the ledge will open up a big hody of ore.

John Barry will start up his mill on the Minnesota mine next week. He expects to turn out the richest concentrates ever sent from the county.

A great deal of prospecting is being done in the Aquarie range of mountaius. This range rune north and sonth on the east boundary line of the county.

Work will be started up on a number of claims in Weaver and Minnesota districts as soon as the El Dorado Canyon mill ie ready to receive ores for reduction.

T. L. Ayres has located a fraction of ground hetween the Old Potomac and Eureka, near Cerbat, and ie doing some work on it. The mines in that vicinity carry gold in paying quantities.

A numher of men have quit the White Hills and have gone into the Grand Canyon country in search of gold and copper. They claim to have a pointer on some good gold property in Diamond Creek country.

The Flores mill will he run this winter either by the Flores Company or hy the parties having claims against it. The mines and mill were sold under execution several months ago, and the company will have to get a move on itself if it intends to redeem the property.

The creditors of the Senator mine and mill have agreed to allow the lessees a short time to run the ore now at the mill through, the royalty to he applied on the debts. Messrs. McLeish & McKay came in Sunday night and returned again Tuesday to start up the mill. It is supposed that there is nearly enough ore at the mill to pay un all indebtedness.

The placers near Palomas are panning ont well with dry washere. As eoon ae water ie placed in reach they will turn out boodles of the shining metal.

The ore now heing taken from the lower level of the Nighthawk mine is almost solid ruby silver. The streak is the largeet yet uncovered in past working of that property, and a vaet amount of money will he taken ont in a short time.

MONTANA.

TO START UP.—Butte *Inter-Mountain*, Dec. 9: Rumors have heen afloat to the effect that the St. Lawrence mine would soon etart up, and there is every reason to believe that it will soon be working. The only point of delay is the new railroad, which is not quite ready yet to haul ore. The Anaconda mine has the largest force at work of any of the Anaconda group. The other properties are working about half force. An idea of just how extensively the Anaconda company ie operating may be gleaned from the item of coal. A Union Pacific coal man says the smelters at Anaconda are consuming ten cars of coal and five care of slack daily. When the plant ie in full operation the consumption is 40 cars a day.

The large mining companies are layiog in their winter fuel eupplies, so that snow blockadee will not force them to euspend. The Anaconda company hae about 1000 tons of coal on hand, the Colorado company 600 and the Butte & Boston a like amount.

The local copper emeltere are etill working with vigor. The Heinze plant is turning out now at the rate of ahout 35,000 pounds of pure copper per day.

The American Development and Mining Co. has made important copper discoveries in ita property near Whitehall, known as the Golden Sunlight group. Manager Bacorn says two carloads of ore shipped from there to the Heinze and the Colorado smelters have netted $600 each to the carload. The ore shows 20 per cent copper and 25 ounces silver and about $50 in gold. The company started out with the intention of developing a gold mine, and the recent developments have heen wholly surprising and unexpected. The copper ore was discovered in a winze and has widened from one to four feet. Mr. Bacorn feels highly elated over the prospects. He has found a number of pieces of pure copper in the ore, which he prizee as a curiosity.

The Blue Bird leaching plant, which has heen at work on tailings from the Blue Bird mill all eummer, has been closed down for the season on account of the cold weather. The success of the work has been most gratifying, and when the tailings thaw ont next spring Superintendent Van Zandt will resume the work, which has been under his management.

BRITISH COLUMBIA.

RAILROAD ASSUREN.—The Kaslo people are about to he rewarded for their abiding faith in their terminal advantages for a railroad, says the Spokane *Mining Review*. The Kaslo-Slocan people have at last wakened up, and the contracts are already let for clearing the right of way, the same to be completed before Jan. 1, 1894. Surveying parties have been in the field for several weeks, and Kaelo has assumed an air of renewed activity. It is thought that the Great Northern has been interested in the building of the road. The objective point for this season ie the mouth of Sandon creek, about 28 miles from Kaslo. When it is taken into consideration that this will he the nearest route to a smelting point hy many miles, and will greatly facilitate the handling of Slocan ores, something of the importance of this route may be realized. When this road is completed the ore may he landed at the smelter in Great Falls or Spokane and returns made in less than a week'e time. Until the smelter at Pilot Bay is started, and that cannot be until the Crows Nest Pass cut-off of the Canadian Pacific is completed to furnish fuel, the Great Northern will have the shortest route to smelting points. The Spokane Falls and Northern comes next, and the route around by the Canadian Pacific will require several days longer, and yet from present indications this road will be first in the field.

NEW MEXICO.

PAYING WELL.—Silver City *Enterprise*, Dec. 8: There are 16 men at work on the Lone Mountain Mining Company's property at Lone Mountain. Under the very economical management of Mr. John Brockman this property is paying good profits. The mill is running steadily with good resulte.

Ernest Kitt and Ben Laswell have struck very rich gold ore tn the Mondero mine at Silver Creek in the Mogollons.

Max Schutz has on exhibition a five-ounce gold nugget, panned out in San Domingo gulch last Tuesday. The *Enterprise* has on exhibition a half-ounce nugget, picked up by children at play in the same gulch a few weeks ago.

Pat McDermott is working nine men on the Laura mine at Carlisle. Forty tons of ore were shipped from the mine this week. The ore will run up in the hundreds; it is about equal in gold and silver values.

Mogollon hullion ahipments for the past week include four bars from the Maud S. weighing 422 pounds, and four from the Little Fannie weighing 437 pounds.

John H. Bragaw is showing what practical knowledge and experience, combined with economical management will do with one of our long-neglected gold-mining camps. He keeps the Gaddis mill at Gold Hill running steadily, and besides making a fair profit himself is furnishing many mines and mine-owners in that camp with fair remuneration for their labor, out of the proceeds of ore heretofore allowed to go to waste on the dumps of the many mines and prospect holee at Gold Hill. Last Saturday he ehipped $900 in gold hullion, the proceeds of a few dsys' run. The Baltimore claim, which Mr. Bragaw recently leased to James Wilson, ie producing ore which runs $30 per ton on the plates. Since Mr. Bragaw's advent in the camp, new impetus has been given to every gold mine, and the mines have all paid well thus far for the lahor expended upon them.

IDAHO.

GOOD CLEAN-UP.—Idaho *World*: The Blaine mill finished crnshing six tone of Buffalo ore last Sunday evening. The gold was depoeited in the hank yesterday morning. Its weight was 40 ounces, worth about $14 per ounce. The yield per ton wae $93.33, which ie certainly very high for free-gold ore. The ownere of the mine, Charles and F. H. Cooper, will soon start a tunnel on the ledge, which they will follow for the purpoee of opening up a large amount of etoping ground. The two crushings made from the mine this fall prove that it is one of the most valuable of the gold propertiee of the county.

MONTHLY STATEMENT.—Following is a synopsis of the manager's report to the DeLamar Company for the month of November, 1893:

Tons crnehed	3,413
Value hullion realized	$77,218 00
Value ore shipped	10,000 00
Miecellaneous receipts	1,080 00
Total	$88,298 00
Expensee	38,883 97
Estimated profit	$49,414 03

OREGON.

A MINING SALE.—Baker City *Democrat*, Dec. 7: Negotiations for the purohase of the Badger, Nellie Gray and Grover mines, situated on the west slope of the Elkhorn mountain near Rock creek, which has been pending for some time

past, have terminated in the ownership of the property passing from Messrs. Isador and Herman Fuchs and E. W. Beckworth of this city to Messrs. E. A. Pennington and N. T. McMillan of Fort Worth, Texas. The property is also known as the Beckworth group, given the name of the discoverer, who explored these valuable lodes about four years since. The group has been developed on a small scale for several years, and enough work has been accomplished to show up its true worth. The average assays run $40 in gold. Two four-horse teams, loaded with supplies, have left the city for the mines, and the road between the two points will be kept warm until the winter supplies are in. Fourteen men have been put to work on the property and no time will be lost in placing the mines on the bullion-producing list. The Robinson mill has been leased, and Messrs. Pennington and McMillan expect to commence crushing ore by the first of next week.

RICH STRIKE.—Baker City *Democrat*: On Thursday evening the stage from Elkhorn mountain brought in a large sample of ore from the Baisley-Elkhorn mine, weighing about 300 pounds. This large chunk was taken from the south drift of the mine, where a new and exceedingly rich body of high-grade sulphurets have been exposed, the vein averaging from three to four feet wide. At the present time the mill is not in operation, and development of the mine in the opening up of the new ore bodies will be the principal work at the Baisley-Elkhorn the present winter. The reason of the closing down of the mill was the failure to save the values. The company have under consideration a better process for ore reduction, and will introduce the treatment at an early day.

NOTES.—Jacksonville *Times*, Dec. 8: Messrs. Beck & Black have leased the Sherer & Windom claim in Josephine county and will commence active operations at once.

Wickstrom Bros. & Corliss have purchased the placer mines of Loomis & Hay on Jones creek for $650, and will work the claims to their full capacity this season.

The two mills operating in the Bohemia district have each produced $25,000 worth of gold bullion the past year. The Annie started up again last week. The Bohemia will remain closed until spring.

The mill owned by Dr. Flanagan and Z. Moody, and which has been operated in Williams Creek district for some time past, has been removed to Ashland precinct, where it will crush quartz from the Sherman ledge.

T. J. Chapman, the newly appointed receiver, will soon take charge of the Hammersly mine, in Jump Off Joe precinct. The property is considered to be quite valuable, and a mill has been operated there with considerable success for several months past.

The Bohemia Mining Company has had a prosperous year, and the mine is in good shape for the resumption of work in the spring. The company has made only a 71-days run with a small five-stamp mill, but has averaged over $170 per day. The mine will be extensively developed this winter, as its owners are now convinced of its wealth.

Mining Commissioner C. W. Ayers returned last week from Chicago with three blue ribbons which he carried off for mining exhibits from this State. One is for a placer mine in operation, awarded to Mr. Ayers. The others are one for collective exhibit of gold ores and one for collective exhibit of gold, silver, copper and lead ores, by State of Oregon.

NEW MILLS.—Four new quartz mills are expected to be set up in the vicinity of Ashland this winter.

GOOD CLEAN-UP.—Baker City *Democrat*, Dec. 9: The White Swan continues to keep up its reputation as one of the leading Baker county bullion-producing mines. Yesterday the last ten days' output was brought in and deposited at the Baker City National Bank for shipment. The exact amount of the bullion was not stated, but it is known that it is the largest clean-up had for a long time.

PROSPECTING FOR PLACER GOLD.—Baker City *Democrat*: Col. J. M. Duffy, of Huntington, who is on a visit to the city, informs the *Democrat* that a large amount of prospecting for placer gold is being done on Burnt river, and considerable ground is being located. Some very rich finds are reported, and the locators are losing no time in placing the ground in share for the spring run, and, with a good water season, which is already promised, a large amount of the precious dust will be taken out.

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Market Reports.

The Markets.

SAN FRANCISCO, Dec. 14, 1893.

The silver market has remained almost uniformly even during the week, both at home and abroad. Prominent silver leaders will meet Friday in Washington for a two days' conference for the purpose of raising money and devising means to secure a silver majority in the next Congress. It is conceded that the anti-silver majority is so large as to preclude the possibility of direct legislation favorable to silver. The attendance promises to include most of the influential silver men from all parts of the country, and the conference will be participated in by many friends of silver in the present Congress. It is expected to raise $100,000 to begin an extensive silver propaganda.

The House Committee on Coinage, Weights and Measures has postponed all consideration of the Bland bill until the second Thursday in January, with Bland's consent, as he found opposition to its being pushed at present.

The Coinage for November.

The several mines of the United States coined during the month of November all the styles of coin known to the American system except two. The aggregate coinage for the month and for the 11 months ending November 30th was as follows:

	For November.	Jan. 1 to Nov. 30.
Double eagles	$2,380,000	$18,318,800
Eagles	5,355,600	19,189 c90
Half eagles	3 054 200	9,700,775
Quarter eagles	.....	75.157
Standard dollars	.....	1,455,565
Half dollars	4,000	1 756,783
Half (Columbian) dollars	.....	2,026,052
Quarter dollars	69,200	2,147,775
Quarter (Columbian) dols	.....	10,006
Dimes	69,140	700,196
Five cents	58,100	604,978
Cents	41,200	418,716
Totals	$11 031,440	$56,403.973
In 1892	2,590,200	44,002,995

All the double eagles coined during November were issued from the San Francisco Branch Mint.

Copper.

The copper market, which a week since reached 10½ cents per lb., has dropped somewhat, but the situation on the whole is stronger. The cause of the advance has been the entrance into the market of large buyers. At the same time a speculative demand arose. The demand for copper to go abroad has been limited, as people on the other side will not pay the higher prices ruling here now. On the other side, however, where consumption continues to exceed all expectations, the statistics for the last fortnight show a decrease of 400 tons in visible supplies, in spite of the heavy shipments from here, which have been said by some home manufacturers to have been made against orders placed by speculators. This, however, does not seem to have been the case, as, if it had, visible supplies would have increased, not decreased.

Lead.

The proposed tariff seems at last to have had its effect on lead, which is down to $3.10 per hundred, after a brief and ineffectual struggle to advance. Since the beginning of the panic of the past summer, prices for pig lead have been from ¾c to 1c per lb. lower than for many years past, and, with the silver and lead markets in their present condition, the only reason for a continuation of such prices lies in the fear of imports of foreign lead being made if the duty is removed.

Silver and the Metals.

NEW YORK, Dec. 14.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.	Copper.	Lead.	Tin.	
Thursday	32¼	69⅝	10 50	3 30	20 50	
Friday	32⅛	69⅝	10 40	3 20	20 45	
Saturday	32	69⅜	10 25	3 20	20 45	
Monday	32	69⅜	10 25	3 20	20 45	
Tuesday	32	69⅜	10 25	3 10	20 45	
Wednesday	32	69⅜	10 25	3 10	20 45	

San Francisco Metal and Coal Market.

ANTIMGNY.		QUICKSILVER.	
Per lb	— @ 13	Home trade, pr. flask	40 50 @41 00
BORAX.		STEEL.	
Refined, in car lots	— @ 7½	English, lb	— @ 20
Powdered, do	— @ 7½	Cauton tool	— @ 24
Concentrat'd, do	— @ 7½	All grades jobbing at advance.	
COPPER.		Bl'k Diam'd tool	8½@ 15
Bolt	23 @ —	Pick & Hammer	6½@ 10
Sheathing	23 @ —	Machinery	4 @ 5
Ingot, jobbing	— @ 20	Toe Calk	— @ 4½
Do, wholesale	15 @ 16	PIG TIN.	
IRON.		Spot ℔ lb	21½@ 22
Bar, base	— @ 2½	COAL.	
Norway, base	— @ 4½	SPOT FROM YARD—PER TON.	
PIG IRON.		Wellington	$8 00
Spot.		Greta	7 50
Eglinton ℔ ton	18 00@—	Nanaimo	6 50
Glengarnock	18 50@—	Gilman	6 00
Am. Soft, No. 1	—@—	Seattle	6 50
Shotts No 1	19 50@—	Coos Bay	5 50
Puget Sound	—@—	Cannel	9 00
Clay Lane White	19 00@—	Egg, bard	12 00
Langloan	22 50@—	Wallsend	7 25
Garsherrie	22 50@—	Scotch Splint	8 00
Harrow	23 50@—	Brymbo	7 50
Cargofleet	—@—	West Hartley	7 50
LEAD.		TO LOAD—PER TON.	
Pig	— @ 4½	Australian	6 50@—
Bar	— @ 5	Liverpool Steam	6 37@—
Sheet	— @ 6	Scotch Splint	7 00@—
Pipe	— @ 5½	Cardiff	7 00@—
SHOT.		Lehigh Lump	10 00@—
Drop, sizes *smaller* than B, ℔ bag of 25 lbs	$1 75	Cumberland	8 50@—
Do do, B and *larger* sizes ℔ bag of 25 lbs	2 00	Egg, bard	9 00@—
Buck, Balls and Chilled do, ℔ bag of 25 lbs	2 00	West Hartley	7 50@—
		COKE.	
		English, to load	$9 50@10 00
		Do, spot, in bulk	—@12 00
		Do, in sacks	—@14 00
		Cumberland	9 50@—

Mining Share Market.

SAN FRANCISCO, Dec. 14, 1893.

The Comstock market has been very dull during the week, speculation having almost wholly subsided. There are occasionally little spasms of activity and strength which might be compared to the flickerings of the dying embers of a fire. Although business has come to such a standstill, the attendance at the Board-rooms continues large, and the number of customers lounging about the offices of brokers is up to the average of the last two weeks. That more trading was not done by them was probably owing to the fact that they are carrying as many stocks as their means will admit, and are waiting for prices to go up and enable them to make money.

The recent activity in Comstock mining shares brought into Pine street a large number of people who were never "in stocks" before. This class of people has been a great power in sustaining the market, and it is to be hoped that the experience they will have during the next few months will be of great benefit to them.

During the month of November the Eureka and Palisade Railroad Company received in transit to Salt Lake and Vallejo Junction, Cal.: From Eureka Con. mine, 224 tons; Diamond mine, 89 tons; Hamburg mine, 87 tons; Jackson mine, 86 tons; Richmond mine, 68 tons; Phenix mine, 29 tons; Silverado mine, 17 tons; McGarry mine, 15 tons; Idaho mine, 8 tons; Silver Lick mine, 3 tons, and Delaware mine, 1½ tons. Total, Eureka district, 627½ tons.

White Pine district—From Louis Lani, 14 tons; F. Paul, 19 tons; C. A. Mathewson, 71 tons; A. Muir, 53 tons; E. J. McEllin, 51 tons, and G. Siri, 14 tons.

From the Bay State mine, Newark district, 8 tons. Total, White Pine county, 230 tons.

Bullion district, Elko county, "jiggings," 17 tons. H. A. Cohn, Morey, Nye county, 5 tons.

Total shipments during November, 879½ tons.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, December 14, 1893.

9:30 A. M. SESSION.

100 Belcher	8c	200 Ophir	1.60
400 B & B	2.30	350 Potosi	80c
500 Chollar	15c	300 Seg Belcher	15c
300 Gon. Cal. & Va	3.50	100 Sierra Nevada	1.30
150 G & O	1.00	100	1.35
100 H & N	75c	100 Yellow Jacket	85c
550 Mexican	1.05		

2:30 P. M. SESSION.

200 Alta	25c	250	1.00
300 Belcher	75c	200 Ophir	1.55
100 Best & Belcher	2.20	100	1.60
100	2.25	150 Gverman	30c
200 Bodie	30c	100 Potosi	75c
150 Challenge	40c	100 Savage	55c
300 Con. Cal. & Va	3.45	100	60c
150	3.50	100 S Louis	15c
250 Crown Point	50c	200 S Nev	1.30
100 Gould & Curry	1.00	100	1.25
300 H & N	75c	150 Union	1.00
30 Kentuck	15c	100 Yellow Jacket	80c
200 Mexican	1.05		

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING NOV. 28, 1893.

509,714.—BUTTER-MOLDING MACHINE—P. O. Andreason, Ferndale, Cal.

509,640.—ADVERTISING MACHINE—M. Anthony, Berkeley, Cal.

509,716.—TRAP GUN—M. S. Barker, Eugene, Or.

509,836.—CAR—Barker & Reynolds, Los Angeles, Cal.

509,645.—VEHICLE BRAKE—T. G. Barlow, Prescott, A. T.

509,649.—RAISIN SEEDER—S. B. Bliss, Riverside, Cal.

509,843.—HYDRANT VALVE—S. L. Coboon, Battle Mountain, Nev.

509,724.—PRESERVING TIMBER—H. F. Eckert, S. F.

509,726.—STILT—E. C. Emde, Tacoma, Wash.

509,727.—FIREARM—G. B. Garrison, Sumae City, Wash.

509,524.—FIRE ALARM—J. B. Gill, S. F.

509,730.—PROJECTILE—J. S. Griffin, Roslyn, Wash.

509,732.—RIVET FEEDER—H. Hahn, S. F.

509,837.—VALVE—C. I. Hall, S. F.

509,735.—FOLDING CHAIR—G. F. Hanson, S. F.

509,736.—MITER BOX—M. Hanson, S. F.

509,805.—REFRIGERATION—C. S. Hardy, San Diego, Cal.

509,803.—REFRIGERATOR CAR—C. S. Hardy, San Diego, Cal.

509,807.—REFRIGERATOR CAR—C. S. Hardy, San Diego, Cal.

509,535.—SWIMMING SHOE—A. F. Hilker, Biggs, Cal.

509,740.—FILTER—M. Kraker, S. F.

509,741.—FILTER—M. Kraker, S. F.

509,739.—BALL BEARING—G. B. Jacobs, Fremont, Wash.

509,483.—POST HOLE DIGGER—H. Paulson, Sumner, Wash.

509,828.—CARBURETOR—R. J. Rolfson, S. F.

509,691.—LACE HOLDER—J. M. Schlesinger, San Jose, Cal.

509,769.—GIL-CAN FAUCET—A. H. & I. A. Schneter, Gakland, Cal.

509,092.—BICYCLE—L. Shapiro, San Jose, Cal.

509,772.—CHURN—E. Silen, Kelso, Wash.

509,559.—OATS—A. F. Spencer, Sidney, Wash.

509,777.—GAS COCK—E. J. Stoltz, S. F.

509,703.—REDWOOD EXTRACTS—A. Taylor, Edinburgh, Scotland.

509,407.—SAW TOOTH—Taylor & Wimer, Woodville, Or.

509,493.—SPOOL HOLDER—H. H. Thomas, Santa Clara, Cal.

509,833.—CABLE SCREW—C. Vogel, San Anselmo, Cal.

509,561.—ANIMAL TRAP—W. Vogt, Dallas, Or.

509,414.—MUSICAL STRINGS—C. S. Weber, San Jose, Cal.

509,710.—GAS BURNER—Williamson & Buzby, Seattle, Wash.

22,917.—DESIGN—Geo. Rischmuller, S. F.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect secrecy, at reasonable rates, and in the shortest possible time.

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ASSESSMENTS.

COMPANY AND LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T AND SALE.	SECRETARY.
Alta S M Co, Nevada	44	10c	Nov 10,	Jan 4, Jan 23	J E Jacobus, 309 Montgomery
Belcher S M Co, Nevada	47	20c	Nov 13,	Dec 7, Dec 28	C L Perkins, Mills Building
Best & Belcher M Co, Nev	55	25c	Nov 1,	Dec 5, Dec 22	
Challar M Co, Nevada	37	10c	Dec 11,	Jan 15, Feb 5	L Osborn, Nevada Block
Cons Wyoming G M Co, California	3	5c	Oct 3,	Jan 12, Feb 1	Chas E Elliot, 309 Montgomery
Crown Point G & S M Co, Nevada	63	20c	Dec 12,	Jan 16, Feb 6	W J Gurnett, 328 Pine
El Leopoldo G & S M Co, Mexico	4	1c	Oct 25,	Dec 1, Dec 18	Jas Newlands, Mills Building
Gray Eagle M Co, Cal	34	5c	Oct 11,	Nov 23, Dec 13	Jabez Howes, 214 Pine
Inyo Marble Co, California	22	15c	Nov 10,	Dec 14, Jan 13	Chas G Harvey, 309 Montgomery
Jack Rabbit M & M Co, Cal	5	3c	Nov 1,	Dec 2, Dec 22	W W Sargeant, Mills Building
Julia Cons M Co, Nevada	25	5c	Oct 23,	Nov 23, Dec 13	Chas Wetzel, 320 Sansome
La Grange Ditch & Hy M Co, Cal	9	25c	Nov 10,	Dec 13, Jan 3	J Stadtfeld, 309 Montgomery
Overman S M Co, Nevada	69	10c	Nov 10,	Dec 14, Jan 4	A Halsey, 328 Montgomery
Potosi M Co, Nevada	40	25c	Nov 13,	Dec 15, Jan 4	Geo D Edwards, 414 California
Savage M Co, Nevada	82	25c	Dec 2,	Jan 4, Jan 24	Chas E Elliot, 309 Montgomery
Teresa Mining Co, Mexico	12	10c	Oct 27,	Dec 7, Dec 23	E B Holmes, Nevada Block
Yellow Jacket S M Co, Nev	56	25c	Nov 10,	Dec 21, Jan 27	K J Willats, Flood B'l'g

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE
Andes S M Co, Nevada		J W Twiggs, Nevada Block	Dec 13
Gould & Curry S M Co, Nevada	Annual	Alfred K Burbrow, Nevada Block	Dec 15
Mount Diablo M & M Co		R W Heath, 318 Pine	Dec 18
Peer Mining Co, Nevada	Annual	Aug Waterman, Nevada Block	Dec 18
Peerless Mining Co, Nevada	Annual	Aug Waterman, Nevada Block	Dec 28
Weldon Mining Co, Nevada	Annual	Aug Waterman, Nevada Block	Dec 28

Cal. Debris Commission Notices.

THE CALIFORNIA DEBRIS COMMISSION having received petitions to mine, by the hydraulic process, from W. R. Stewart, in the Badger mine near Ono, Shasta Co., and to deposit tailings on adjacent flats; from Glonzo Engle, in the Walker mine, near Igo, Shasta Co., to deposit tailings behind dams in Pomeroy Gulch; from McKinstry & Gilbert, in the Christmas Hill Seam diggings, near Butcher Ranch, Placer Co., to deposit tailings on the banks of a fork of the American river; from W. R. Read, in the Tannery Ravine mine, near Challenge Mills, Yuba Co., to deposit tailings behind dams in Tannery Ravine; from Manuel Mateos, in the Mateos mine, near Sierra City, to deposit tailings in Howard creek; from Jos. Davis, in the Davis mine, near Sierra City, to deposit tailings in Howard creek; from Frank Barbero, in the First Chance mine, near Sierra City, to deposit tailings behind dams in Howard creek; from Philip McGuire, in the North Star mine, near Mokelumne Hill, Calaveras Co., to deposit tailings behind dams in Buckeye Gulch, and from J. W. Smith, in the Green Mountain mine, near Mokelumne Hill, to deposit tailings behind dams in Chile Gulch, and from the 54 Flat Placer Mining Co., in the 54 Flat mine, near Volcano, Amador Co., Cal., to deposit tailings behind dams in a dry ravine—gives notice that a meeting will be held at Room 92, Flood Building, San Francisco, on January 2, 1894.

Assessment Notices.

CO-OPERATIVE PRINTING CO., 408 Sacramento St., S. F., Cal.

Notice is hereby given that at a meeting of the Directors, held on the 22d of November, 1893, an assessment of $2 per share was levied upon the capital stock of the Corporation, payable at the office of the company, to the Secretary, on the 22d day of December, 1893.

Any stock upon which this assessment shall remain unpaid on the 22d day of December, 1893, will be delinquent and advertised for sale at public auction, and unless payment is made before will be sold Monday, the 8th day of January, 1894, at the office of the company, at 1 o'clock P. M. of said date, to pay the delinquent assessment, together with the cost of advertising and expenses of sale.

MORGAN BACKUS, Secretary.

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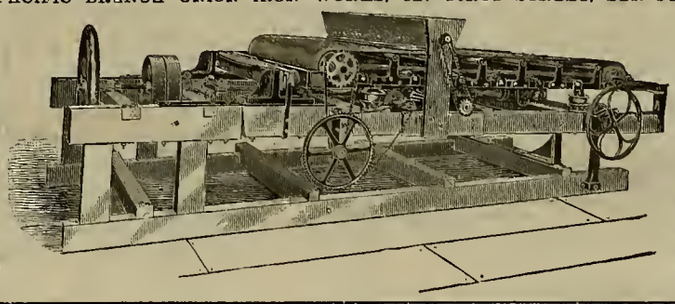

FALLS MINE, Igo, SHASTA CO., CAL., May 25th, 1893.

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MINING AND SCIENTIFIC PRESS.

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VOLUME LXVII.
Number 26.

SAN FRANCISCO, SATURDAY, DECEMBER 23, 1893.

Three Dollars per Annum
SINGLE COPIES, 10 CENTS.

The River Convention.

The River Improvement convention held its fourth annual session at Sacramento last Friday and Saturday, about 60 delegates being present. A memorial to Congress was adopted praying for the adoption of the contract and special commission system for the Sacramento, San Joaquin, bay of San Francisco and navigable waters emptying into the bay; also for the opening of navigation to Redding, and on the San Joaquin to within 30 miles of Fresno, and the further improvement of Oakland harbor. The convention elected delegates to the Trans-Mississippi Congress, called on the river and bay counties to contribute to a fund to send delegates to Washington to remain until the object is accomplished or Congress adjourns, and elected an executive committee of 26, which will meet within ten days to select the Washington delegates. The convention decided not to join hands with the miners in asking Congressional aid for the rivers, though the discussion on that matter was spirited. It is worthy of note that Grove L. Johnson of Sacramento said he looked upon the miners as "natural enemies," a declaration that may be considered somewhat surprising by those who heard Mr. Johnson's very eloquent speech, breathing peace and good will, at the Miners' convention two years ago.

While the miners may not endorse the spirit which dominated the convention, they can rightly be considered as friendly to its purposes. They heartily favor river improvement for the benefit it does the valley interests as well as the indirect benefit it affords them. Their direct interest lies in the construction of works which shall impound the debris and wash from the mountains and allow resumption of hydraulic mining. The convention gave official utterance to no expression which might be construed into opposition to this proposition, and it is to be assumed that the valley interests will not, through the delegation which it is proposed to send to Washington, oppose an appropriation for that purpose. There is no reason why the two interests should be at cross purposes on this matter. On the contrary, it is possible that each may be of help to the other; if not by active measures, at least by a policy of non-interference. That seemed to be the desire of the Sacramento convention, and let us hope its representatives will govern themselves accordingly.

PLATE I. — GREENSTONE VEIN IN THE GOVER MINE.—*See page 404.*

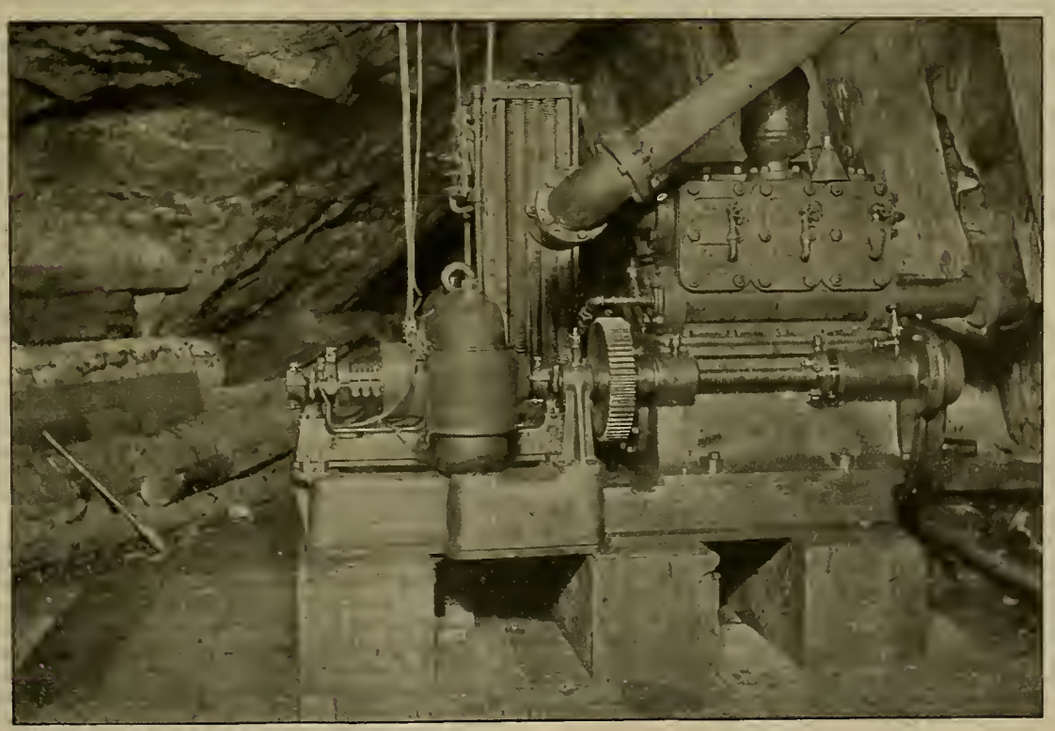

PLATE II. — ELECTRIC UNDERGROUND PUMP AT THE GOVER MINE.—*See page 404.*

SENATOR VOORHEES, late champion of the repeal of the silver purchase clause, has introduced his promised silver bill, and Senator Stewart declares it is a sham and a fraud. It provides for the coinage of the silver seigniorage; for the purchase and coinage of $2,000,000 worth of silver per month after the coinage of the seigniorage; for the retirement of all gold coins of less denomination than $10, and for the appointment of an international monetary conference. While the bill has some good features, it does not meet the views of either the silver advocates or their opponents. It is a good thing to retire small paper currency; and an international monetary conference, though slow, may lead to benefit. The $2,000,000 provision is simply a half-measure.

A NEW million-dollar smelting plant for San Francisco bay is projected by a syndicate of Omaha capitalists, headed by Wm. Lelour. The company is to be known as the Occidental Smelting and Refining Company, and it will handle all kinds of ores. It is said the Great Falls, Montana, plant will be duplicated.

THE Copper Queen Mining Company of Arizona paid a dividend of $50,000 in November, making $300,000 for the year.

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Entered at the S. F. Postoffice as Second-Class Mail Matter.

San Francisco, December 23, 1893.

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THE MARKETS.—Eastern and Local Metal Markets; Coal and Coke; Mining Share Market; Sales in San Francisco Stock Board; Notices of Meetings; Assessments; Dividends, etc., 415.

MR. W. S. CHAPMAN this week makes a very complete reply to the strictures of "Investor" (D. S. Callahan, 1003 Devisadero Street, San Francisco) on the mines of California, which appeared in a recent issue of this paper. Mr. Chapman has been closely identified with the mining industry of this State and he is as well able as any other man to demonstrate its valne. To the broader statements of Mr. Callahan's letter, declaring in effect that there are no good mining properties left in the State, it seems hardly necessary to make answer; and Mr. Chapman does away with its specific assertions. California is now, as it has always heen, the best, most important and most extensive gold field in the world. Gold mining is here on a basis as fixed and certain as any other industry; and it is to-day more remunerative than any other general pursuit. There are here better opportunities for investment than in any other gold field in the United States and, we think, in the world. If a capitalist cannot with due diligence find a gold mine that gives reasonable promise of proving remunerative, he must pursue curious methods of search and have strange ideas of what a gold mine is.

THERE is excellent reason to believe that Arizona will be admitted to Statehood at the present session of Congress. The lower house has passed an admission bill by a large vote and the Senate will likely take similar action. The chief objection to admission lies in the claim of Eastern Representatives that the balance of power in the United States Senate will more than ever be fixed with the West which is more populous than the East. These opponents of a righteous measure have probably forgotten that that is precisely what was intended to be accomplished when our wise forefathers placed in the Federal Constitution a provision that every State should have two Senators, irrespective of population. To maintain a perpetual union of States they foresaw that each must have an organization as complete and stable as another; and to prevent the strong dominating over the weak, they devised this scheme. Arizona has important mining and agricultural resources, and it has, besides, sufficient patriotism, intelligence, and population, to become a State of the Union. We hope its star will soon be pinned to the flag.

A GREAT DEAL OF ATTENTION has recently been directed to the new placer districts about 30 miles northeast of Mohave, California. Many miners have recently gone in there, and reports are of numerous rich finds. Indeed, considerable sensational matter about the new districts is now being printed in the southern California press. But, allowing for exaggeration, it appears that the new fields have real worth, and are destined to yield considerable gold. The great trouble with the districts is the scarcity of water. Dry washers are used chiefly. A review of the Goler, Red Rock and Summit districts, from a Los Angeles paper, will be found in our Mining Summary. It is given for what it is worth.

The Cruiser Olympia.

The cruiser Olympia, constructed by the Union Iron Works, which on her recent unofficial trip gave indication of being one of the fleetest, if not the fleetest, vessels in the navy, had her official trip last week and maintained an average speed of 22.058 (estimated) knots for four hours. This result is highly satisfactory to her builders, to naval officials and to the public, as it again demonstrates the capabilities of the Union Iron Works for cruiser construction, and adds to the naval force of the nation a commerce destroyer of great speed and power.

The Olympia is a cruiser of the 20-knot class, and she has, by exceeding requirements, earned a bonus of something like $300,000. The builders receive $50,000 for every quarter knot above 20 knots, up to 21.50 knots, and a premium above the latter figure. The Olympia has two triple-expansion engines and twin screws, while the Columbia, her great rival, has three triple-expansion engines and three screws. It is a fact, however, that the Olympia is the more formidable vessel, as the following comparative statement will show:

Batteries.	Columbia.	Olmypia.
Eight-inch rifles	1	4
Six-inch rapid-fire guns	2	.....
Five-inch rapid-fire guns	.....	10
Four-inch rapid-fire guns	8	.....
Total main battery	11	14
Six-pounder rapid-fire guns	12	14
One-pounder rapid-fire guns	4	6
Gatlings	4	4
Total secondary battery	20	24

The Olympia can throw a thousand pounds of shell from her 8-inch guns while the Columbia is throwing 250 pounds from her one weapon of that class, and 600 pounds from the rapid fire guns of her main battery while the Columbia is discharging 464 pounds from hers.

A ship like the Olympia on the Atlantic coast is the New York, which was built by the Cramps, subject to the same speed requirements. The New York made 21 knots on her trial trip and earned $200,000. The New York is 2980 tons more than the Olympia and cost $1,189,000 more. But her achievement, while reflecting credit on the Cramps, cannot justly be regarded as being equal to that of the Olympia.

THE next session of the Trans-Mississippi Congress is to convene in this city February 13th, during the Midwinter Fair. The special importance of this convention to the mining interest will be disclosed when it is remembered that this year's Congress at Ogden passed resolutions strongly favoring the hydraulic mining industry, and asking an appropriation of $450,000 for the purpose of carrying out the Caminetti Act in construction of restraining works. A similar resolution at the coming session will be of substantial value in promoting a bill for an appropriation before the Federal Congress. The Trans-mississippi Congress has in a few years become a most potent organization. It has been instrumental in securing much legislation of benefit to the Western States. The delegates from San Francisco, appointed by Mayor Ellert, are as follows: John Van Bergen, H. L. Dodge, B. F. Dunham, P. G. Sabatie, D. C. Camarinos, C. B. Rode, I. N. Walter, W. J. Sloan, S. H. Seymour, Wendell Easton, Charles Meinecke, I. H. Morse, E. J. Coleman, Oscar Lewis, George B. Sperry, Percy Bsamish, C. A. Laton, W. W. Shannon, Henry Payot, W. W. Sanderson, H. J. Sadler, Eugene Avy, E. Kruse, Henry S. Martin, P. B. Cornwall, E. W. Newhall, S. Nicklesburg, Robert Wieland, Adolph Sutro, J. L. Rathbone, B. P. Flint, Albert Gallatin, Geo. W. Gibbs, L. B. Parrott, John H. Hegler, A. S. Hallidie, M. H. Hecht, Irving M. Scott, Charles Goodhall, Fred W. Eaton, F. J. Symmes, J. K. Firth, W. H. Crocker, J. J. Valentine, J. B. Stetson, John D. Spreckels, C. M. Yates, C. S. Laumeister, A. Sbarboro, Will E. Fisher, C. W. Cross, Arthur Briggs, Rolla V. Watt, John Taylor, I. Truman, S. K. Thornton, Gustav Sutro, Barry Baldwin, W. W. Montague.

WILLIAM B BUCKMINSTER, who is at Washington as the representative of the quicksilver interests of California, has appeared before the committee twice and made arguments to show that unless at least ten cents per pound duty, the existing rate, is imposed on their product, the mines in Napa and Lake counties and elsewhere in California must close down. It ought to be evident to Congress that Mr. Buckminster's representations are well founded. The leading quicksilver mines of California are operating on a very small margin of profit, and they are exceedingly sensitive to tariff legislation. From being a heavy exporter of quicksilver, when a high or low tariff might not make a great difference, the country has in late years been gradnally changing to the position of an importer. At present our mines are just about able to supply home demands. Entrance into this market of the Spanish output will destroy the equilibrium of demand and supply, and be harmful to the industry.

Mr. Chapman Replies to Investor.

TO THE EDITOR:—"Investor" has undertaken to criticise an article written recently by me in regard to the future mining interests of this State. The plain inference to be drawn from his criticism is that the mines of California, if they ever existed at all, are played out or very nearly so; and, as a proof of this, he says "he has run all over the State for the past two years in search of a mine and has not yet found one."

The fact that Investor has been unsnccessful in finding a mine does not by any means prove that mines do not exist in this, the greatest gold-mining country in the world. California, since its discovery, has produced $1,250,000,000 in gold. This constitutes about one-fourth of all the gold in the world; yet this mining was done with crude appliances and by inexperienced men.

It is only within a few years that the science of reducing ores and extracting the gold from the various kinds of ores and the chlorination of snlphurets has been even partially understood, and now experiments are being constantly made looking to the closer and more economical manipulation of the almost limitless varieties of ores—each and all of which require a slightly different process. With our improved facilities and onr better knowledge of mining and of reducing ores, and with the benefit of our now large experience in every phase of mining, we find that mines which 20, and even 10, years ago wonld not pay at all can now be worked very profitably. Mines which have been worked to a limited extent many years ago, and abandoned because they would not pay, are now being taken up and worked with great success and with scarcely a failure. In this connection I will cite the operations of Mr. Hayward, who is doing more mining by far than any other man in California. He has within the last year commenced to open up a number of new (old) mines, every one of which has been *left* years ago by Investor or such inexperienced miners as he or his friend, the "quiet gentleman from the East," who has unfortunately expended $150,000 in testing and looking for a mine, and, like Investor, found nothing that suited him and is "abont to return to his Eastern home in *disgust*."

That quiet gentleman, if he will call upon some good mining man (and they are not scarce), can be shown mines that will pay splendidly, and plenty of them. For the benefit of this quiet but disgusted gentleman, as well as for the disappointed Investor, I will cite a few examples of old deserted mines which have been examined by innumerable experts, so called, and condemned: The Kennedy, which has paid in dividends this year only a little short of half a million dollars; that mine has lain idle, deserted, abandoned for many years, and has been walked over and ridden over many years by mining experts. The great Utica mine, now owned by Mr. Hayward, is paying enormously, the output for last October being $182,000. It was owned by men now in this city. They had a mill on it, I think of 20 stamps, and could not make it pay. They sold the mill, and later sold the mine for $1000, and thought they had done a wise thing. I have not learned whether Investor was their adviser, but snrely he or some expert of equal repute did serve in such capacity.

I will now cite the Rawhide mine as another striking example of this character of mining. That now famous mine was worked many years since by very capable men from some part of Europe, I believe, and a large amonnt of gold extracted. They got down below water level and concluded the ore was rebellious (a word that never should be applied to any ore), built a very large and expensive mill said to have cost $200,000, put in pans to rednce the sulphurets (a dead give-away) and made a disastrous failure, left the mine, and after many years it was bought for $17,000, and is now owned by Mr. Nevills and Messrs. Ballard & Martin, and they have opened the mine down to the 500 level and they find ore that goes from $20 to many thousands per ton. This mine was on the market for years, bonded at various times and examined by numberless experts, such as are very active in hunting mines but never yet have been known to find one.

I might name mines almost without limit which have been carefully examined and sampled by experts who never saw a pick and shovel, much less a drill or a stick of giant powder, and I might say right here that this class of men are an incnbus upon the mining industry and the prosperity of this greatest of all mining States in the world, so far as statistics show.

I cannot refrain from mentioning one more instance to prove that the mines of California are not worked out long since, and that capitalists may look for investments in that line with confidence. I refer to a mine that many years ago was worked upon the surface, and kept more than 100 arrastras in profitable working, but finally they got down to the water level, had no appliances to lift the water from the mine, no power to handle a pump; and the mine was sold in England. The syndicate supplied a large amount of working capital, sent out a *titled dude* as sole manager.

He hnilt roads, dng a ditch and huilt a mill, having hrought from the mother conntry a water-wheel that if half the Sacramento river had been skillfully applied it might have turned the empty wheel around. He did not thlnk in the meantime to develop his mine, hut spent all his money and hecame involved in deht, and retnrned home for more capital hut failed to *dupe his friends* a second time. Finally suit was hrought, judgment obtained, the mine sold under execution, bonght in by the present owner, who has now honded it, and it will prohably fall into competent hands who will no donbt have a repetition of the Utica, Canada, or possibly the Rawhide over again; but should it unfortunately fall into such hands as *Investor*—alas! how unfortunate for the "quiet" seeker after mlnes.

Investor says: "Fearing Mr. Chapman may think I did not properly choose my territory, I will inform him that among the things looked into were two extensions of the 'Taylor.' They were both well opened with ledges from 20 to 100 feet in width, and reputed to run from $4 to $10 per ton, hut after most careful testing they actually went only from 50 to 75 cents." Now the facts are that the extensions of the Taylor mine, hoth north and soutb, are entirely intact, not opened at all in any manner, not 20 feet nor 100 feet wide so far as known, were neither of them either seen or tested hy Investor, hecause not a pound of ore is or ever has heen visihle in either extension hecause not opened in any way whatever. Investor makes a sad deviation from the truth when he says he tested them, for he never saw what is and ever has been invisihle to any and all. True, the Roscrans location does join the Taylor on the south, and has heen prospected to a depth of three or fonr hundred feet, but it is a narrow vein entirely in the green stone and pitches to the west, while the Taylor lies entirely east of the greenstone which constitutes its foot-wall and dips to the east, but really has no connection with the Roscrans. He never prospected either of those extensions, and if these constitute two out of the twenty-four mines he "experted and examined" since January of this year, it is hardly to be wondered at that he "found hut one of them suitable." If this is the kind of examinations he has been making and reporting to his "friend, a quiet gentleman from the East," it is not strange that his friend is going hack "to his Esstern home disgusted."

Investor says he has been "running all over the State for the past two years in search of a mine and has not yet found one." If tbis he true, he should take a rest and not impose his experience npon others who can and do find good mines and who can show his friend, a "quiet gentleman from the East" good, safe mines where he can for much less than $150,000 get such mines as will return him more than that sum net profits every year, and such properties will he shown within one day of San Francisco. Investor says that "for years he has not known of any mine which has been sold through the agency of these parties," that is, the agency he so hitterly denounces. If that he so, these agencies have not injured or swindled any one, not even the "quiet gentleman from the East." If they are doing nothing, why may they not escape the assaults of this marvelous expert, who, like them, has done nothing for two years, though the whole State has heen "rnn over" by him?

I will add that in 1880 Mr. S. K. Thornton visited Nevada City to look at the Providence and some adjacent mines, and while there happened to pass hy the Reward mine which is bonnded on one side by the corporate line of that city. He was favorahly impressed with the location and never lost sight of it, hut in April last formed a syndicate of a few friends, ohtained satisfactory conditions from the owners, and they have expended up to this time $11,300 and are now supplying a mill with ore that pays them $17 per ton, and the mine is now paying more than development expenses. Mr. Thornton is not a Freihurg expert, hut a plain, common-sense hnsiness man.

I hope Investor will in future, when he criticises me, do so over his own signature and not hide behind a fictitious name.

I hand you a slip from the New York *Herald* which shows a different opinion, based, too, upon statistics, from that entertained hy Investor. W. S. CHAPMAN.

CALIFORNIA'S GOLD OUTPUT.

Expert miners and prnspectnrs predict that the new South African gold fields, of which the wnnderful city nf Jnhanneshurg is the commercial center, will, when fully developed, prove to he the richest ever discovered. The character and extent of the depnsits in that territory certainly warrant the expectation that further operations will place it amnng the most famnus mining regions in histnry, its output already exceeding that nf any other district nf similar gengraphical area with the single exception nf California.

It is to California, indeed, that historians must turn for the standard with which to ascertain the comparative richness of all other gnld fields. The record nf that State in the yield of the precious metal stands without parallel in the history of mankind. No nther territnry ever developed gold depnsits so extensive, sn rich nr so enduring, nor has any ever witnessed prnfitahle mlning operations extending over such long periods of time. [illegible]

The gold produced in California since 185n exceeds $1,25n,000,000, and the yield at present amounts to about $13,000,000 a year, or perbaps $7,000,000 mnre than that of any nther State. The output has decreased somewhat in recent years, hut the decline is due nnt tn any general exhaustinn of the territnry, hut to the suspension of the hydraulic mines, which of themselves turned out something like $10,000,000 annually.

These figures set a high mark fnr boomers of the South African gold fields. They represent a contrihution to the wealth nf the wnrld never equalled hy any similar area of territory nn the face of the earth. And Califnrnia, nnlwithstanding the diversion of vast sums of her energy and capital to prnfitable mining operatinns for other minerals, is still turning out mnre than one-third of all the gnld prnduced in the United States.—New York Herald.

Lead and the Tariff.

TO THE MINERS OF THE UNITED STATES:—The new tariff bill imposes a tax of 15 per cent ad valorem on lead dross, and on lead in lead ore, and allows all lead in ore wbich is bigher in silver value tban in lead valne to come in free. Tbe pnvision in eitber clause will paralyze the lead industry in this country.

The former will he 15 per cent on the lead price at Spanish or Mexican ports, wbich price is not ahove the equivalent of 1½c per pound, or say about 1·5c per pound duty. The latter means free lead in vast quantities; or allowing that lead comes in balf and half nn tbe ahove scbednles the duty on the total qnantity will be on the average only 10 cents per 100 pounds. At present tbat would mean refined lead laid down at $2.35 to $2.40 in New York City, which price for lead would net only about 1¼c per ponnd to the Western shipper. Any American mine-owner can calcnlate where he will come out on that. Nor must we he decelved hy the specious plea of those who desire tbis low tariff, and say that the demand from America will advance the European market to a 3½c limit, for the hest authorities state that Spain, Australia and Mexico can turn nut 50,000 tons per annum from their reserves witbout advancing prices more than one-quarter of a cent per pound.

We therefore strennously urge every miner to write to his Congressman and Senator a protest against these lead clauses, and we also urge every mining camp to organize a movement against it and to unite and form a general State committee and to have tbem organize a general central committee. We also nrge all cfficers of lead-mining companies to write and authorize Mr. Hugh N. Camp, of 55 Liberty street, New York, to attach their names to a petition to the Committee of Ways and Means praying them to alter the hill so as to give lead in ores, drosses, etc., a reasonahle protection. The amount of tbe product of their several mines shnuld also be added so as to give weight and value tn the petition. Work in this direction will pay hetter than mining just now.

THE ST. JOSEPH LEAD CO.,
Hugh N. Camp, Treasurer, Missouri.
DESLOGE LEAD CO,
Firman Desloge, President, Missouri.
DOE RUN LEAD CO.,
C B. Parsons, Vice-President, Missouri.
PICHER LEAD CO.,
O. H. Picher, President, Joplin, Mo.
BUNKER HILL & SULLIVAN MINING CO.,
F. W. Bradley, President, Wardner, Idaho.
SAM'L W. HAUSER,
Ex Governor Montana, Helena, Montana.
OLD JORDAN & GALENA MINING CO.,
A. F Holden, Salt Lake City.
NATIONAL SMELTING & REFINING CO.,
Harton Sewell, President, Chicago.
WILLIAM F. JAMES, Salt Lake City, Utah.
L. E. HOLDEN, Cleveland, Obio.
SENATOR D. H. MOFFAT,
Pres. Amethyst Mine, Denver, Col.

New York, Dec. 11, 1893.

Foundry Notes.

THE London *Industries and Iron* of November 24th contains an illustration and description of the battleship Oregon, built by the Union Iron Works.

TWO WOODAUBY CONCANTAATOAS have jnst besn shipped to E. G. Stoiber, Silverton, Colorado, making the second consignment for Mr. Stoiber; and three have been seut to Kookomo, Colorado, for the Wilfley mill.

THA Parke & Lacy Company have jnst shippsd a complete five-drill air-compressor ontfit (Iugersoll-Sergeant) to the Harqna Hala miue, Arizona; and a complete two-drill ootfit to Spencer & Sharps, Grub Gnlch, Madera coonty.

DISPATCHES from Washington state that Senator Perkins has resolved that if there is a possibility of getting soch a measure throngh Congress he will have a gon fonndry located at Benicia, Cal. As is well nnderstood in California, it will reqoire something like a $3,000,000 appropriation to pnrchase a site and establish the necessary plant. Perkins, of course, provided he is soccessfol, does not expect at this session to get the reqoired amonnt of the appropriation. Abont all he looks for is an appropriation for the pnrchase of a site and sufficient money to begiu work on the buildings. Even if Congress shonld decide, however, to establish a gun foondry on this coast, California Senators wonld naturally meet with strennons opposition from Senators Mitchell and Dolph of Oregon and Sqoire of Washington. Heretofore the Oregon Senators have endeavored to get Congress to appropriate enongh money to estaonisn a gun fonudry nn the coast, and, naturally, desire it located somewhere in their State. Sqnire has also been an advocate of this matter, bnt he wants it located somewhere on Puget sonnd. In view nf this fact, it wonld appear neccessary for the Pacinc cnast delegation to arrive at some amicable nnderstanding as to the location before snch measore could he passsd by Congress.

Sliokens.

THE Tombstone, Ariz., Mining and Milling Company is pntting in a cyanide plant.

THE outpnt of the Ella miue, between Banner and Julian, is $13,500 for the 60 days in which crushing has been done.

Wells, Fargo & Co. has attached the Clinton Consolidated Gold Mining Company for $5387.51, which represents several claims.

THE Great Western qnicksilver mine of California is credited with paying a dividend of $12,500 in November and $137,500 for the year.

DEADWOOD, S. D., claims the largest matte smelter, largest and most soccessful chlorination works in the world, and a large cyanide plant nearing completion.

PAICAS of wood at Virginia City are now greatly reduced, being as follows: Best nnt pine wood, $10 psr cord; limb wood, $8.25 per cord; split pine and tamarack, $8 per cord.

C. A. CRAWFOAD AND C. P. POST are reported to have sold the Little Annie Gold Mining Company's property at Snmmitville, Colo., to the Consolidated Gold Mining Company for $2,000,000.

THREE Nevada prospectors have nnearthed 500 pounds of amalgam from the lot of Mrs. Newman, Dayton. It is snpposed to have been stolen from the Birdsall mill, 17 years ago, and bnried.

THA Treadwell mine on Dooglas Island, Alaska, has a 240-stamp mill that crushed dnring the last fiscal year 257,255 tons of ore, abont 700 tons daily. This ore yielded $694,659 in bullion, leaving a net profit of $385,614. The average yield per ton was $2.13 in gold bulliou.

THA Superior Conrt of Pierce coonty, Wash., has returned a verdict for Albert Richardson for $10,000 damages in his suit against the Carbon Hill Coal Company. Richardson snstained injnries while in the employ of the company two years ago that crippled him for life. The coal company is owned by the Sonthern Pacific Railwsy.

THA Osborn Hill Mining Company, at Grass Valley, will show a qnartz specimen at the Midwinter Fair, 7 feet long, 2½ feet wide and 18 inches thick. It will weigh abont 2 tons. Some free gold is ehown in the quartz. T. J. Ahern, who performed the difficult work of quarrying out the specimen, says it will be exhibited in its present shape without being polished.

HANRY BAATNOBER, manager of the Mining and Financial Trust Syndicate, London, who is now in the city, says the price paid by the syndicate for the Harqua Hala mine was $900,000. Tbe syndicate has in all invested about $60,000,000 in American properties. Of this amonnt it paid $2.000.000 for the De Lamar, $1,000,000 for tbe Elkhorn and $900,000 for the Harqna Hala.

A DISPATCH has been received from New York announcing that D. H. Moffatt and Eben Smith had sold the Victor mine, one of the best at Cripple Creek, to an English syndicate. The price is uot stated, bnt is snpposed to be $1,000,000. Moffatt and Smith paid $50,000 for the mine, and it has yielded a profit of about $50,000. The Mary Davin mine at Cripple Creek has just been sold to George Mechen of Cbicago for $50,000.

DR. BANKS of Lovelock, Nev., tells the *New Era* that $150,000 have been set aside as a working capital by the National Nickel Company, to be nsed in bnilding redoction works in Cottonwood canyon and developing the company's nickel mines. He also states that the machinery and other snpplies have been pnrchased and are awaiting the order of Sopt. Bell to be forwarded to the mines as soon as the weather will permit.

AT the recent annnal mesting of the stockholders of tbe Andes Mining Company, 94,505 shares were represented, and the following officers elected for the ensoing year: Nat T. Mssser, president; William Edwards, vice-president; and Herman Zadig, William S. Lyle and C. O'Connor, directors. J. W. Twiggs was re elected secretary and Jossph Ryan superintendent. The secretary's financial statement showed a credit balance of $4273.30.

AT the recsnt annnal meeting of the stockholders of the Gould & Cnrry Mining Compauy, 79,052 shares were represented, and the followiug officers elected for the ensuing year: H. V. Havens, president; Charles H. Fish, vice-president; and Thomas Anderson, Thomas Fish, J. N. Sonther, Herman Zadig and A. K. Durbrow were re-elected directors. A. K. Dorbrow was re-elected secretary. His finaucial statement showed a credit of $5910.98.

THA statement is printed that as the resnlt of an assay made in this city the owners of the Sheep Ranch mine in Calaveras county find that for years they had been throwing away as worthless volcanic ash carrying from $5 to $6 a ton in gold. This ash or capping lies over the auriferous gravel in which is foond gold. It was snpposed to be worthless. The resnlt of the assay therefore caused great snrprise. Specimens of the ash may be seeu at the State Mining Bnrean.

AMONO the interesting specimens recently received at the State Mining Bnrean is a piece of gold qnartz from a chnte in the Plymonth mine in Amador conty. Otber specimens are pieces of gold quartz from the Bay State mine in Amador coonty, and a sample of anriferons vein matter from the Kennedy miue. A piece of slate from the footwall of the Keystone mine is interesting as a cnriosity from the fact that, instead of splitting off smoothly, it is corrngated.

AAOUMANT has been begnn before Judge Morrow in the United States District Court in an action in eqnity bronght jnst ten years ago hy Jane M. Gray of Virginia and twelve others, residents of that State and of New Jersey, against the New Almaden Qnicksilver Mining Company. The plaintiffs claim that they are entitled to one hnndred and fifty-four four-hnndredths of the New Almaden mines near San Jose by virtoe of a title from the Mexican Goverument, March 21, 1850, to a tract of land known as the Rancho de los Capitancillos, on which the miues were discovered.

Photography and Mining Reports.

TO THE EDITOR:—The art of underground photography has of late made such progress as to deserve the special attention of mining engineers. By its aid they may now illustrate their reports with pictures plainly showing the exact appearance of ledges, ore bodies and other featnres of importance; and if the practice of employing such illustrations once becomes general, the value of mining reports will be considerably enhanced. Indeed, I doubt not that in the near future no mining report will be considered satisfactory if it be not fully illustrated by means of photography.

As an example of the excellent results now obtainable, I send you a copy of a report I have just made upon the Mayflower and South Mayflower mines on the great "mother lode" in Amador county, California. This report, as you will observe, is illustrated by some exceptionally fine photographs of points uoderground, and I trust you will permlt me to add that in the event of any of your readers being desirous of having a copy, I shall be very happy to supply the same, free of any charge, as I think that by so doing I shall be aiding mining engineers in general. STEPHEN H. EMMENS.

165 Crocker Building, San Francisco, Dec. 15, 1893.

Underground Photography.

Written for the MINING AND SCIENTIFIC PRESS by Newton W. Emmens.

In 1892 I wished to secure some views of the underground workings in some of the bituminous coal mines of Pennsylvania by means of the "flash light." At that time I was in the habit of using the flash powder made by the Scovill Maoufacturing Co., consisting of powdered magnesium and some powerful oxidaot, such as nitrate of soda, chlorate of potash, etc.; but when I attempted underground work with this material I found that owing to the blackness of the coal there was not enough light to make a negative sufficiently strong to print from. I also discovered that it was impossible to tell just *when* the flash mixture was going to ignite, as the fuse employed was very uncertain in its action and sometimes went out altogether without firing the powder. This sort of thing was not sure enough for practical work, so I determined to use *pure* powdered magnesium, in a lamp so constructed as to enable me to get one or more flashes with once charging and thus obtaln as much light as I might desire for each exposure.

The lamps I now use are known to the trade as the "Standard Flash lamp;" and they do their work fairly well, although I find that they do not consume all of the magnesium fed into the flame. The apparatus consists of a vertical cylinder 13·26″ in diameter and 2½″ high into which the magnesium is placed, the top of the cylinder being then closed by a rubber stopper through which two pipes run. One of these is connected with a hollow rubber ball by means of a flexiole tube, and the other is suitably curved and flattened to serve as a jet or nozzle through which the magneslum is ejected into the lamp-flame. Near the upper end of the cylinder, on the outside, are soldered two small sockets, one of which receives a wire carrying a metal reflector, while the other, on the opposite slde of the cylinder, is the support for the lamp proper. This latter consists of ao annular tin box 2¾″ in diameter filled with lamp wick, thus making an Argand burner. The wick is saturated with alcohol and lighted; and then, on squeezing the rubber ball (the cylinder of the lamp having previously been about two-thirds filled with powdered magnesium), a portion of the magnesium is blown into the flame and is lighted, thus causing a flash of vivid light. By squeezing the rubber ball slowly or quickly a long or short flash can be produced at will; and, as an air valve is provided in addition to the exit tube, the number of flashes that may be obtained by alternately squeezing and releasing the ball is only limited by the amount of magneslum in the cylinder.

When taking the pictures that illustrate this article, I used two Standard lamps arranged in such a way that they were both fired at the same time from one ball. This I effected by using a small brass tee to connect the two tubes from the lamps with a third tube terminated by the ball. I was thus enabled to place my lamps at any distance up to ten feet apart and so secure equable illumination and moderate shadow intensity. I may, however, remark that it is desirable to have the lamps as close as possible to the subject to be photographed, while taking care not to allow them to come within range of the lens. In the absence of this precaution the plate is liable to be hopelessly fogged.

Plate I depicts a vein of gold quartz in the 800-foot level of the Gover mine, Amador county, Cal. The camera, owing to the width of the drift and to my using an ordinary view lens instead of a "wide-angle," was placed about 20 feet back from the face. The lamps were set about four feet apart on the floor of the drift, in front of a projecting mass of rock, which made an excellent shield between them and the lens. The number of flashes given was eight and the duration of each was abont half a second.

Plate II shows an electric pump at the 500 station of the Gover mine, Amador Co., Cal. The camera was placed on the opposite side of the shaft from the pump, at the entrance to a short drift. The lamps were placed about three feet apart on the cross plece of a set of timbers one foot behind the camera and ten feet above the floor of the drift. I gave six flashes of about half-a-second duration each.

In plate III, which shows the breast of the east drift at the 300 level of the Mayflower mine, Amador county, Cal., the lamps were placed close together on a pile of attle about four feet in front of the camera and two feet above the floor of the drift. I stood between the lamps and the lens in such a way as to prevent any direct rays of light from enterlng the camera. It will, though, be noticed, on inspecting the picture, that the flames of the candles are very distinct. This is a matter of some little surprise to many persons, as it seems to be the general belief that all lights must be put out when taking a flashlight photograph—a mistaken idea, seeing that the light from a candle is not sufficiently strong to injure a plate. I have even gone so far as to take an interior while a large arc light was in full blaze, and the resulting picture showed no ill effects from the illumination.

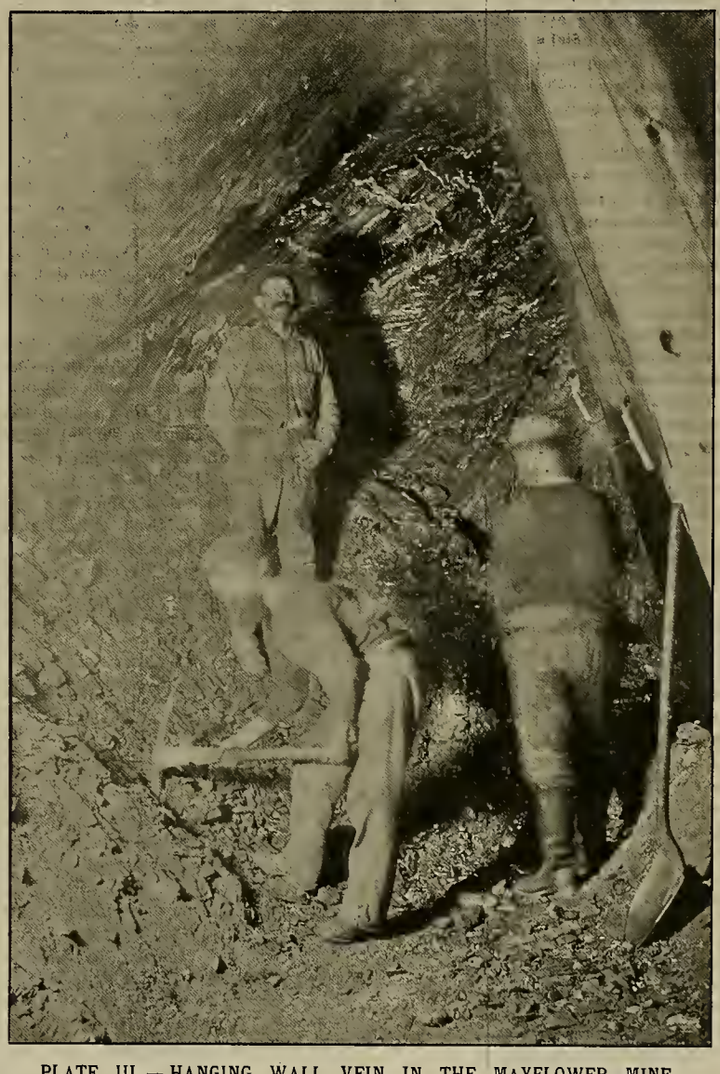


PLATE III.—HANGING WALL VEIN IN THE MAYFLOWER MINE.

In taking the pictures here given I used a Bausch & Lomb universal lens, 8½-inch equivalent focus, with stop No. 16 or F. 16, and a Seed 26X plate. The developer used was Eikonogen and Hydrochinone, Carbutt's formula.

I may also mention that I took the precaution of carrying a supply of developer, etc., with me, and was thus enabled to develop my pictures in my room at the hotel in the evening after dark, so that, if necessary, I could retake any pictures that did not come out well.

NEWTON W. EMMENS.

Tin Mining and Tin Smelting Described.

Tin mining and tin smelting, as far as Cornwall is concerned, are two distinct industries, says the London *Mining World*. The miner raises the tin from the mines, which is always associated with other minerals and impurities, but by a process called dressing, which consists first of reducing the ores to a very fine state, then by a series of washings, the lighter particles, which are the impurities, are largely got rid of. Calcining is then resorted to; this process drives off the sulphur, which more or less is found with all ores. It also facilitates the separation of the iron associated with the ores. After the calcining process the calcined ore is again subjected to a washing process until the tin ore stands as about two to one of the impurity; in other words, in this ore, which is now called black tin, there is about 13 cwt. of clean tin to each 20 cwt. of tin ore, or black tin. In this state it is fitted for the smelters and, assuming the mine owner purposes to dispose of his tin by what is known as the private method, it is taken to the smelter decided on, who makes an assay of the ore to ascertain the amount of metal contained in each ton of black tin. In fair-quality ore this amounts to 13¼ cwt. of metal. This is called the "produce." Of this produce the smelter takes for himself 1¼ cwt. to cover the cost of returning charges, and pays the mine for 12 cwt. only. The value of the metal is arrived at by taking the standard price, or the price rulling in the London market for the time being, the smelter taking care to reserve as large a margin as possible in his own favor, which, previous to the introduction of tin ticketing, ranged from £10 to £14 per ton, probably averaging about £12; that is to say, if the price of tin in the London market was £76 per ton, the price paid to the mine by the smelter would be £64 per ton.

Gold Mining in British Guyana.

TO THE EDITOR:—Kindly permit me, through the medium of the MINING AND SCIENTIFIC PRESS, to reply to several letters inquirlng about the mines of British Guyana. British Guyana lies almost under the equator, and in the zone of greatest precipitation, and ls therefore extremely hot and moist and unfit for white men to work in outdoors. The average annual temperature is abont 80 degrees. Fever and ague are very prevalent in the wet season in the mining districts, which lie from 50 to 150 miles inland. Along the coast the country is low and flat, but it rises gradually into hilly country in the mining districts, which are only a few hundred feet above the sea level. Negroes do all the work and are paid at rates varying from 40 to 80 cents per day. There is no demand for white labor. The gold is obtained from placers in small creeks and gullies, at a depth of from two to ten feet. The ground is patchy, but at times very rich. Rich qnartz specimens have frequently been found in the placer gravel, but no large bodies of payable quartz that I know of. The output of gold for 1891 was about 104,000 ounces; 1892 gave a slightly higher yield, and I believe a still higher return is expected for 1893.

The country is covered with dense tropical forests, through which trails have to be cut, so that prospecting is no plcnic. The mining regulatioos are full of vexatious restrictions and would do honor to the Czar of Russia, or some tyrant of the dark ages.

As to route, I believe that steamers run regularly from New York to Georgetown. In conclusion, notwlthstanding the general depression and bad times here, I would advise no one to leave the United States until he has found a better country to go to. WM. HEPBURN PRENTICE.

San Francisco, December 14, 1893.

REPRESENTATIVE BELL, of Colorado, who is autbor of the suspension of assessment work law, says that it is not necessary for claimants, in filing notice of intention in good faith to hold and work their claims, to prepare separate notices for eacb claim, in cases where several in tbe same district are under one ownership. One notice is sufficient. Representative Bell speaks of "affidavits" in such cases. But the law says nothing about affidavits, simply requiring a "notice." Tbe form given in the MINING AND SCIENTIFIC PRESS November 18th will no doubt be found sufficient.

The Grass Valley Mining District.

EDITORIAL CORRESPONDENCE.

GRASS VALLEY, December 15, 1893.

The mines of Grass Valley have records as steady and remunerative producers equalled by no other district in California, and, therefore, in the world. The district has within its limits the oldest continuous working mine in the United States. It has the deepest gold mine in the world. It produces now more gold than any other camp of like dimensions in the world. And its mines appear just as far from exhaustion as any anywhere. The Grass Valley district is second only to the famous Comstock in fame and aggregate output, the former being $350,000,000 in silver and gold, the latter in the neighborhood of $150,000,000 gold alone. The total gold production of California mines of all descriptions is about $1,300,000,000, of which the greater part has been from hydraulic and placer mines. The Grass Valley output is solely from quartz mines. It seems destined to maintain its prestige as the most important camp in California.

The foregoing may be described in brief as the chief characteristics of a camp that has for years been a very important center of quartz-mining operations. Much of the earlier history of California was written in Grass Valley, and many who are now prominent in public life were at one time or another identified with its growth and progress. The mines of Grass Valley have made many poor men rich, and they are still making rich men richer. The whole district is now enjoying an era of exceptional prosperity, and the present outlook is that operations will assume a very much larger scale and the total output be greatly increased. Deep mining has long been demonstrated to be a success in this district, and there is a uniform purpose on the part of mine-owners to sink deeper. Mines long idle are being reopened, and many of them have already been placed on a dividend basis, or are certain soon to prove remunerative.

It will be worth while to glance briefly at the history of the district and to inquire into the causes which have conduced to its activity, past and present, as well as those causes which have brought about depression and severe stagnation threatening the life of the industry and the permanent growth and advancement of the camp. The first discovery of gold quartz in California was made on Gold Hill, near the present site of Grass Valley, by a German. There were at that time a few settlers and placer miners in the valley, and the German's find seems to have aroused some curiosity but no excitement. Nothing was done. In September, two men who were digging a tunnel on Gold Hill turned out a very rich specimen. Thence dates the first effort to reduce the quartz. Mortar's and spring poles were used, and $20,000 taken in this crude manner. The first quartz mill in the district (the second in the State) was afterward built. The directory of Grass Valley township for 1865 makes the following reference to the mill:

> The French mill is situated on the west side of Wolf creek, Grass Valley. It was built up in January, 1851, by a couple of Germans for J. Wright. This mill, the second one constructed in the State (the first being built in 1850 in Mariposa county) was a common affair, run by water power, having eight round stamps, each stamp in a single mortar.

It will be noticed that the stamps were round and each in a single mortar. It is probable that this statement will be disputed by some old millmen who claim to know about the origin of the California stamp, and who will say that the stamp at that time had not attained so high a degree of development. This pioneer mill was not a success, but another, erected later by Messrs. Somers, Abbey, and Ridgell, was more fortunate. Other mills followed, and the activity in mining operations was considerable. The town had meanwhile been growing, and in 1855 was large enough to suffer a loss of $350,000 from fire. Thirty acres were swept over, 300 buildings being destroyed. The Alison Ranch mine, one of the most famous producers, was discovered in 1855. It yielded at its initial crushing of 18 tons, at the Gold Hill mill, $6000. In December 62 tons produced $23,000. Previous to 1860, the mine had yielded over $1,000,000. The Lone Jack was at this time a celebrated mine, yielding ore in 1860 worth $100 per ton. The total cost of mining and milling even with the primitive methods then in vogue did not exceed $10 per ton at this mine.

And so the community grew and prospered. With the exception of the conflagration of 1855, the early Grass Valley was not subject to the vicissitudes which visited and all but overwhelmed its lusty neighbor, Nevada City. But it experienced hardships that tested its mettle, and might have crushed a less hopeful and hardy people. The adjacent hills were hives of industry, and employment was given to a very large number of men. The population in 1855 was about 3500—less than Nevada City; but the relative positions of the two towns in the matter of population was later reversed. Many mills were erected and were steadily engaged in pounding ore until about 1864, when there was a lull. The Comstock had been discovered, and it proved a powerful lodestone which a population which loved change and excitement could not withstand. No mine in Grass Valley had reached a greater depth than 400 feet, and the hills were therefore barely scratched. The mines had given little or no indication of barrenness; but hundreds nevertheless fled to the new field. The camp continued to produce steadily for many years, notwithstanding the desertion of a large fraction of its population.

Mr. Samuel Butler, a well-known miner and writer of Grass Valley, furnishes me the following paragraph concerning subsequent operations:

"The spring of 1877 inaugurated a period of great depression in the mining industry in this city. This depression lasted through the years of 1877, 1878, 1879, 1880 and 1881. In the summer of 1877 the famous Eureka mine, which, previous to this time, was considered the richest gold quartz mine on the coast, and which had produced fabulous amounts of gold, suspended operations. This had a disastrous effect on other and poorer mines, and was followed by the suspension of operations at the New York Hill, the Omaha, Alaska on the Colfax road, and, later, by the famous Empire. In 1881 the Empire resumed operations, and from this action sprang the period of prosperity which we now enjoy."

The period during which the Empire shut down, however, was comparatively short. It has been operated since 1864 with only slight interruptions, and before that time produced something like $900,000. The Empire has an aggregate record of something over $6,000,000, and is entitled to be considered as a continuous producer for nearly 30 years. The 2100 level was reached some time ago, and sinking is being continued. It is stated that the rock in the Empire is looking much better than for several years, having shown continuous improvement.

The five mines which now bear the nearest and most important relation to the activities of the Grass Valley district are the Idaho-Maryland, Empire, North Star, Omaha and W. Y. O. D., which are all dividend-payers, and are without exception worked on a large scale and at great depths. They are conspicuous examples of the truth that deep mining is profitable. It may be stated as an axiom that no mine in Grass Valley which has struck a pay shoot just beneath the grass-roots will fail to encounter another under the hard rock which invariably intervenes before lower levels are reached. So far as I have heard, no mine in this district which has attempted deep mining on a sufficient scale has failed to pay heavily; and all mines which have been abandoned, or for other causes are idle, have not attempted to sink deep, and failed, in the sense that these five mines are sinking. It is possible that the Idaho may be cited as an exception to this somewhat sweeping generalization, having been worked out at a depth of over 2100 feet; but, on the contrary, the Idaho is a most convincing illustration of its entire truth. The Idaho is altogether the most interesting, as it has been the most important mine in the district. It has yielded in over 25 years of active operation something like $12,000,000, of which one-half has been clean profit. The notable feature of operations is the method of hoisting. The main shaft is 1115 feet deep on an incline of 68 degrees, barren rock being encountered at the 800 level. At the 1000 level a drift was run 325 feet to the east in barren ground, and on the fissure at that point pay ore was struck. From this point an incline shaft, on the pitch of the ledge, was commenced, and continued to a depth of over 1850 feet on the incline, or 1100 feet perpendicular below the 1000-foot level, making the total depth of the mine over 2100 feet, nearly vertical, believed to be the deepest gold mine in the world. The hoist and pumps on the incline shaft are worked by compressed air from the surface, the necessary machinery being placed in a large cavern at the head of the second shaft. The workings of the Idaho mine were long in the direction of the Maryland claim, and litigation arose between the respective owners, the contention being advanced by the latter that the Idaho people were working in their ground. The dispute became famous, and seemed likely to be protracted; but last spring a compromise was effected by which the Maryland bought the Idaho mine and surface works. The terms have not been made public, but it is well understood that the consideration was about $100,000, to be paid out of the profits from the mine—nine-tenths to the Idaho Company and one-tenth to the Maryland, until paid. Meanwhile, the mine has been operated under a provisional arrangement, with two superintendents, each representing the several parties in interest. So successful and profitable has been the operation of the mine during the past eight months (since May 1st) that the entire obligation will be discharged by December 31st, and New Year's day the Maryland Company will enter into permanent possession of the consolidated properties. It is obvious that the present working of the Idaho-Maryland is cumbersome and expensive, because of the distance of the workings from the surface works and the necessity of long hauls and double handling; and there is no doubt that the new owners will, sooner or later, sink on the Maryland proper, and abandon the Idaho workings. It is worthy of note that since the opening of the Idaho, and the payment of the initial assessments necessary for its development, the mine has never failed to pay frequent and regular dividends.

The North Star is now the equal of the Idaho-Maryland in value and extent of operations; and is, indeed, in many respects the bright particular star of the Grass Valley mining firmament. While it is doubtless true, as Mr. Butler states, that the new life began for Grass Valley with the resumption of operations at the Empire mine in 1881, special stimulus was given to the industry by the resumption of work on this mine in 1884, after a long period of inactivity. The North Star occupies much the same relation to the history and activities of the Grass Valley district that the Providence does to the Nevada City district. Its equipment is in all respects model; its management is systematic and efficient. The North Star has abundantly demonstrated the practicability of deep mining, and has now for some years been a large dividend payer. The mill has 40 stamps, which pound out ore day and night. The 2400 level has been reached on the incline. The principal work is confined to the 1900, 2000, intermediate (2050), and 2100 levels, the ledge in each drift ranging from 12 to 16 inches in size. The electric bell system has been introduced at the mine. Instead of a hard pull to give the signals all that is necessary is to press a button and electricity does the rest. Another improvement in contemplation is the lighting of all the mine and works by electricity. About 65 lights will be required. Superintendent Abadie has a very neat and handy contrivance, prepared by himself, showing the underground workings of the mine from the 1800 to 2300 levels. It consists of a series of plates, the work on each level being drawn on its appropriate glass. The model shows at a glance where work is being carried on.

This letter has already been extended to length greater than originally designed, and it will be necessary to postpone until next week mention of other matters worthy of note in the Grass Valley district.

E. B. P.

Dissimilar Occurrences of Gold-Bearing Quartz.

Abstract of Contribution to Discussion of Mr. T. A. Rickard's paper by Mr. Rickard, before the Colorado Scientific Society.

In the course of his very interesting contribution to the discussion, Mr. Argall made a reference to the mother lode of California, and he quoted a remark made by a writer (Mr. H. W. Fairbanks) in the tenth annual report of the State Mineralogist. I do not know upon what facts is based the statement that the veins of that region are equally rich whether they traverse slate, diorite or serpentine, but a two years' acquaintance with the lode structure of the best developed portion of the gold belt—the counties of Amador and Calaveras—induces me to offer the following observations: There is a noteworthy relation—call it a coincidence, if you will—between the character of the country rock and the richness of the quartz veins which it incloses. All along the series of extensive and productive mines, stretching for 20 miles from the Cosumnes to the Mokelumne river, the country rock is a black slate. The vein filling is also of the same character. The lodes rarely occur in the diabase, but rather in the black slate at or near its contact with the "greenstone" dykes. A piece of ore brought by me from the Wildman mine, at Sutter Creek, Amador county, is quite typical of the mother-lode region, and exhibits the ribbon structures and graphitic-slate casing, both thoroughly characteristic of the productive veins.

That "the lodes in the slate are almost entirely composed of quartz, while in the serpentine there is a considerable amount of gangue invariably included in the vein," is a statement which I cannot corroborate. If the lodes of the main gold belt of California have one feature more marked than another, it is the inclusion of country rock and the ribbon structure so produced. In this respect the lodes occurring in slate are certainly no exception. May I mention a personal experience? A mine whose lode was massive white quartz occurring at the contact of an augite schist and a diabase was found poor indeed, but another lode only a thousand feet farther east occurring in a black slate and carrying quartz ribboned with inclusions of country rock was found to be far more gold bearing than its neighbor. This one experience was confirmed by observations made elsewhere in the same region since that time, and also by the experience of the oldest mine managers with whom I discussed the matter. All veins in black slate are not richly gold bearing, but most of the rich lodes are in black slate, and an unnumbered quantity of veins in greenstone and schist have been found worthless. That is as near to a generalization as I dare venture.

The Thames mining district, whose lode structure I

have briefly described, has a geological connection with the Hot Lake region of Rotorua, about 45 miles distant. At Rotorua, at one time famous for its lovely pink and white terraces, there are numerous thermal springs, geysers and fumaroles. The surrounding plain is largely covered with fragmentary andesite and rhyolite. This material is for the most part loose and unconsolidated. Near the edges of the fumaroles, however, it has become cemented, and here very much resembles the country rock of the mines of the Thames. Further, the rims of the fumaroles show products of decomposition identical in character with those observed near the lodes, and which have been referred to as the soft and granular material, often called "tufaceous sandstone" by the miners.

While at the Thames the andesites are usually brecciated, it must be added that solid andesite rocks also occur occasionally. The latter often gradate into the former, and appear to have penetrated through them, recementing them. This region very forcibly suggests the inter-relationship observed elsewhere between young eruptive rocks, thermal springs and lode formations. The accurate study of this association of geological phenomena would do much to give us definite ideas on the subject of the genesis of ore deposits.

Turning to the note which I offered on the subject of the Ballarat "indicator," I would wish to refer to a description, which I only saw a few days ago, of a very similar occurrence in a neighboring mining district. In the Quarterly Report of the Victorian Mining Department for December 31, 1888, there is a description by Mr. E. J. Dunn, a well-known colonial geologist, of the Champion Reef at Wedderburn. Wedderburn is close to Dunolly, and nearly 50 miles distant from Ballarat. This is a part of Victoria celebrated for the large nuggets which it yielded in the early days.

Mr. Dunn gives a vertical section which has many features resembling the sketch made by me in the New Normanby mine. He says that "it shows the influence of the band of country rock called the 'indicator' on the productiveness in gold of the intersecting quartz leaders." In parenthesis I would say that the term "leader" as used here is unfortunate. A "leader" is a quartz vein or seam which "leads" a miner. In this instance, the "indicator" itself is the "leader," and the intersecting quartz veins can be better called "cross veins." He continues: "The country rock is of yellow and gray, soft sandstone and clayey beds, having a strike N. 5° W. and a dip 60° to 80° E. One of the beds of rock is of dark gray to black color and from five to seven inches wide, made up of thinly laminated unctuous clay. This is known to miners as the 'indicator.' At intervals of a few inches to several feet apart are flat leaders of quartz, from a quarter of an inch to one foot thick. These dip to the N. W. at angles ranging from 20° to 30°. Where they intersect the 'indicator,' the latter is generally displaced a few inches. At and near the intersections the quartz leaders become auriferous, and often richly so, the gold occurring in coarse nuggety pieces and frequently of crystalline character. The leaders are barren except at the intersections with the 'indicator,' or of nearly vertical thin quartz veins called 'droppers' by the miners. A portion of the 'indicator,' on assay, gave only a trace of gold, unweighable, but this result is nevertheless regarded as important, showing the actual presence of gold, in however small quantity, in a particular band of the country rock, in contiguity with which bands the quartz veins are found richly auriferous."

I must ask pardon for so long a quotation, which is only permissible because the geologist quoted is one of the most accurate of observers, and because it very completely confirms the note which appears as a part of my paper. To that note I may make the following additions:

Though at the level where I obtained my sketch the "indicator" is only slightly dislocated by the cross veins of quartz, yet in other parts of the New Normanby mine there are floors or slides which throw it for from 12 to 25 feet. These faults have a strike and dip similar to that of the cross veins. While the latter at the 700 and 800-foot levels have a flat dip to the east, yet nearer the surface they incline west. The "main lode" of the mine, a fissure vein cutting across the bedding of the country rock, is less profitable to exploit at the lower levels than the line of the "indicator" where intersected by cross veins; but at surface, the 50 feet of country separating the "main lode" from the "indicator" was so richly gold-bearing as to have been all removed by open cuts.

The association of organic matter with ore deposits has been often pointed out. In this instance, the observations above recorded may be summarized by saying that both in the mines of Ballarat East and in those of Wedderburn, places nearly 50 miles apart, gold is found to occur in notable quantities wherever cross veins of quartz intersect a thin seam of graphitic clay or slate which is conformable with and forms part of the bedded sedimentary rocks.

The New Gold Fields of Western Australia.

[From the Prospectus of a London Mining Company.]

Western Australia is a *terra incognita* from the mining point of view, even to those persons who claim to be most intimately acquainted with that industry. And yet all kinds of minerals exist therein, and at the present time the total area of the proclaimed gold fields, as we gather from the Government blue-books, now exceeds 130,000 square miles. It was only so late as 1886 that any attempt was made to develop the known resources of Western Australia, but the results so far rival those obtained in the same time from almost any other gold field that can be named. For example, in the 17th year following the discovery of the South African gold fields the production is stated to have been 200,000*l*., while the gold fields of Western Australia, which have scarcely attracted any public attention at all, exceeded that sum in their seventh year of working, and also in their first seven years of working raised more gold by 70,000*l*. than South Africa produced in the first 14 years. Notwithstanding the enormous sums poured into South Africa for the development of its mineral wealth, the above facts stand out prominently; and yet in Western Australia the dearth of capital has been most marked, and there has, in fact, been no attempt of anything like a deliberate kind to obtain it. The money used in working the mines was subscribed locally, and from its expenditure results that are almost wholly unknown to English readers have been produced of a very satisfactory kind.

Let us refer, for example, to the Yilgarn, the Murchison and the Coolgardie districts, which are at present the most noteworthy of the West Australia gold fields. Dealing with Yilgarn first, we have before us the returns of six mines, which, between them, crushed 29,161 tons of ore, the yield of gold being 29,801 ozs., the value being 109,130*l*., and the average yield per ton 1 oz. 1 dwt. 14 grs. This is the return to the end of July, 1892; but far more remarkable to state, the return for the half-year ending June 30, 1893, was 21,070 ozs., being more than double the return of the previous six months. We have little to say about the Murchison gold field, which was only proclaimed in September, 1891, but during the first 11 months of 1892 the gold recovered was worth 80,000*l*. This field is described by the Government geologists as "exceedingly rich." To the Coolgardie field considerable attention has been called of late, in consequence of a very rich discovery made about 112 miles from the Yilgarn Railway. The discovery was made by a man named Bailey, who sold his claim to Mr. Sylvester Browne. Ten thousand ounces of gold have been obtained in six months from the reef, without a battery and without machinery, equal to treating only 200 pounds of stone per day, exclusive of 2500 ounces of gold obtained by Bailey before the sale. Public opinion in the district, and to a large extent outside of it where the facts are known, is disposed to rank the Coolgardie gold field as about the best on the Australian continent, while its richness, so far as developed, is said to eclipse anything that has been known before. About 3000 men are now on the field, to which, of course, there has been the usual rush.

So far, we have dealt with these gold fields in a somewhat general way, but we propose to refer to the views expressed in one form or another by some of the leading men in the colony. For example, Sir John Forrest, Premier of Western Australia, describes it as "a rich mineral country," and basing his opinion on this fact, he adds, "It seems to me that even those who are most sanguine can scarcely foresee what will be the destinies of this part of Australia." Speaking about a year ago, the Premier said, "Gold is now being found in so many localities, and in such quantities, that it is likely shortly to become the greatest factor in our prosperity." His Excellency, Sir William C. F. Robinson, at the opening of Parliament in July last, spoke of Western Australia as likely to become "one of the greatest gold-producing parts of the world." The Premier so late as August last said, "The export of the gold from the colony during the 12 months ending June 30 amounted to 276,807*l*, an increase during the past year of 105,408*l*." These are the testimonies of persons in supreme authority, and now we come to those of experts of established reputation. Dr. E. D. Peters, writing to an American paper, of the Coolgardie gold fields, says, "There is every reason to believe that a new gold field has been opened up of greater richness and extent than anything that has been discovered in Australia since its early days." Mr. W. E. Fallis carefully inspected one of the reefs of the Coolgardie estates and found it to be a true fissure, carrying free gold. We might go on quoting many other testimonials, but will only add that of Mr. Sylvester Browne, who, when interviewed with regard to the Coolgardie gold fields, is reported to have stated, "There are numberless reefs and all of good size." He added, "they invariably carry gold," and said, "this is going to be one of the finest reefing fields ever discovered in Australia."

Mines on the Lower Colorado River.

IN TWO PARTS—PART II.

The Picacho Mining District.—One mile above the "Azure King," on the California side of the Colorado, is the ten-stamp mill that ponnded out much gold in early days. Three miles westerly over a good "wash" wagon road, clustered near the base of "Chimney Peak," or Picacho, are the mines. These mines produced good pay from several rich and extensive chambers, but are now holding a low-grade ore, though specially free in gold. Doubtless systematic exploiting by a thoroughly competent superintendent, with "no strings on him," would result in the discovery of other ore chambers of like extent and value. There's the rub! A self-respecting, competent mining man does not care to exploit "has been" mines through orders from parlor miners in New York, who don't know the strike of a ledge from a railroad strike. That there is a future for the quartz mines of Picacho district the writer has never doubted. An English company, at great expense, have erected a pumping plant at the river to ground sluice for the gold that is certainly of good value in the gulches and impregnating the gravel mesas of this district. The success of the venture will hinge on the management of the enterprise in its inception. If they have not secured the services of some eminently qualified practical hydraulic engineer, it may be written down a failure. There is too much expense, too many leaks, in this method of lifting for miles the volume of water required in placer mining, to monkey with any experimental measnres. In all probability it will ultimately pay—provided our English cousins do not weary of assessments.

Three miles yet to the north, and 50 miles by river to Yuma, and 30 miles by trail on the California side, we find the village of Mortons Landing, maintained solely and alone from the produce of the mines of Silver district.

Silver District.—Mortons Landing has a postoffice and the general supply store of Levy & Casaras, a public school of 25 pupils, and the largest settlement between Yuma and the Needles on the Colorado river. The mines are five miles westerly over good wagon roads. The veins of this district are remarkable for strength and continuity. There is a system of four parallel ore channels, cropping boldly with an average width of 20 feet between walls, and a northwest and southeast trend, clearly defined, with unbroken croppings, three to five miles in length. In the southeastern part of the district the ledges are in a contact of porphyry and granite, where the "soft" or smelting ores are had. The granite pinches out and the porphyry gives way to trachyte, as the ledges reach north and the ore changes to a "dry," free-milling silver chloride, with not two per cent of lead, as shown in the Clip, Rooster and New Deal claims—an excellent illustration of the influence the inclosing walls of a mineral has on the kind of ore deposited. The general country formation is porphyry.

The "Red Cloud" mine, leased by Judge Levy and sublet to working men, on royalty, is the principal producer. From 60 to 100 men are constantly at work in and about this mine.

The average value of shipments is high, about 100 onnces silver and 60 per cent lead per ton. Here are the values of some of the last shipments, from samples submitted to the writer by the miners, in different lots:

132	ounces	silver	.....	56	per cent lead.
170	"	"	.....	45	" "
174	"	"	.....	58	" "
240	"	"	.....	64	" "
288	"	"	.....	66	" "

No assays were had lower than these. New finds are being made by underground workers. The last assay given, 288 ounces, represents an ore chimney lately uncovered by Manuel Velusco, having from four to six inches of this ore in place, though it may be remarked that Velasco, a skilled miner, worked with varying success for several months, driving for this rich chute, before finding it. It is in this haphazard tribute way in which this mine has been operated. This magnificent property for years has been handled in this desultory way. There is clean metal at the water level, 400 feet deep. The ledge is strong here between smooth granite walls, and unexplored ground above. From the old "Remnant" samples of ore shipments were assayed by the writer, the returns giving

No. 1—	171	ounces	silver	.....	46 per cent lead.
No. 2—	665	"	"	.....	—

There is but little soft ore in this mine, principally a silver chloride and glance in an iron manganese, spar and quartz gangue stuff.

This is essentially a low-grade mining camp. In its entirety, the ores are smelting and milling and we write only of those mines now shipping, simply referring to the "Clip" and "Rooster," with above a year's run of 20 stamps, of 12 to 30-ounce ore in place in the mines. Five feet of 40-ounce ore are exposed in the "Deal," 17-ounce ore in place on the "Parnell," uncovered by shafts and cuts, and numerous lesser deposits are known to exist, of free milling

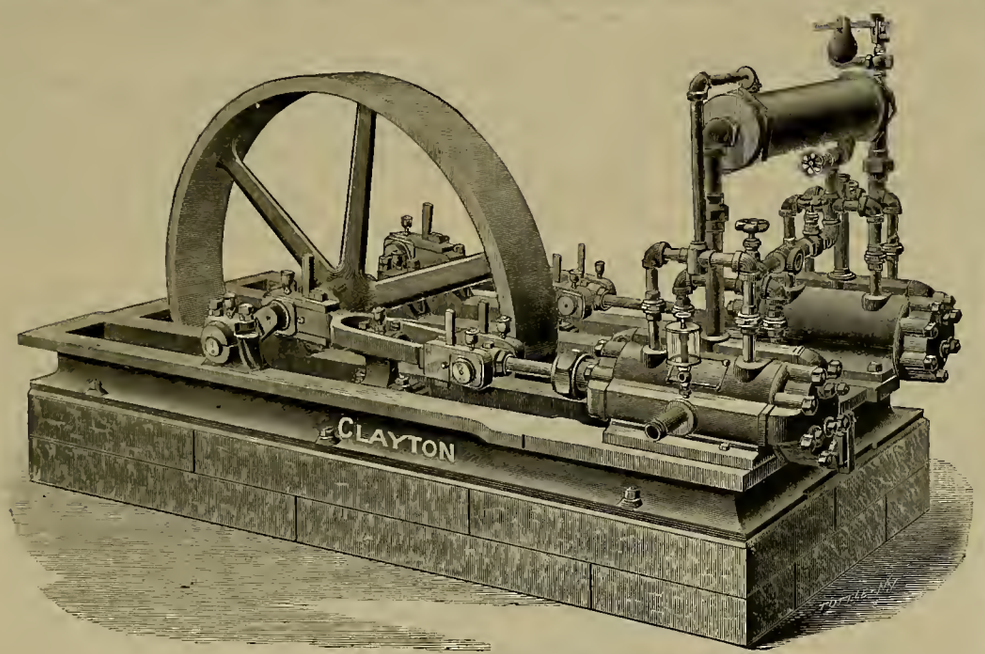
chloride of silver ore, in the camp. These will he made to pay when silver shall have somewhat recovered its old old standing and real worth.

Old Johnston Camp, adjoining Silver district to the south, is a clear smelting deal in porphyry and slate. The ore is in small seams of clean metal, though regular and strong, and from which much good ore of 40 to 80 ounces silver, and 658 per cent lead has been and will he shipped for many years to come.

Now, let the reader bear in mind, all of the districts mentioned have not one company with any pretense of capital behind it, with the exception of Judge Levy and Vomocil, both of whom came to this country poor men on day's work; hence a living illustration of what thrift and rustle may do. The mines now shipping, and thus supporting so many of our citizens, were carried by our merchants of Yoma until such times as they became independent, and the merchants deserve to, and have been, well repaid for their confidence in the resources of Yuma county.

This letter is written that inflowing capital may know that not in citrus possibilities and agricultural fields is Yuma county alone rich, but that money judiciously invested will return a good profit from her mines, and there are many such to be had that will repay investigations throughout the county. We write only of the mines directly tributary to Yuma, and which the writer has personally examined.

Again, remember all these mines are easy of access, are



CLAYTON BELT-DRIVEN DUPLEX AIR COMPRESSOR.

free ores, no antimony, arsenic, zinc or other refractory minerals to combat and reduce their values. Labor is cheap; miners $2 per day; no strikes; work continuing without cessation the year through. And what is written of Yuma county is more or less applicable to southern Arizona.

TAYLOR D. MACLEOD.

San Francisco, December 11, 1893.

Forest Conservation.

[An Essay by Abbot Kinney, Lamanda Park, Los Angeles County, at the Los Angeles Convention of Fruit-Growers.]

The importance of a conservative forest policy is nowhere greater than in California. It is now fully established by the forest experience of France, Germany, India, Australia, etc., that judicious management will give a high and perpetual product of bark, fuel, tar, timber, etc., from the forest without injury to the forest reserve.

As great as is the value of a perennial and secure source of forest products, and as much as we may esteem the forest from a sportsman's side or regard it from the sentimental or sanitary view, it is all as nothing to its influence on the delivery of the rainfall from a country's watershed.

A forested watershed will deliver a given rainfall regularly and slowly over a long period as compared to the delivery of the same rainfall from the watershed deforested. The trees, roots and humas detain and divide the rainfall, so that the water has time to he absorbed into the soil and rock veins. Thus in a forested district there are none of the harrancas and gullies generally in a bare country. In California we have gullies and washes in the southern section with little forest and small rainfall, while at Mt. Shasta, with 60 to 90 inches of rainfall and a mountainous forest, these land scars are practically absent. On a bare mountain watershed there is little opportunity for the rain to be absorbed or for it to replenish the springs and sources of perennial water supply, consequently the rainfall from such a district is delivered suddenly and in a short time, and we have dangerous and destructive floods. As a watershed is without forest the delivery of its rainfall is uncertain and injurious.

We are quite safe in saying that in California "As the mountains are deforested so will the perennial character of the springs and streams diminish or he lost, while on the other hand floods and torrents will increase in force and destructiveness. The water flowing regularly from the forest mountain is the aid and servant of man in his mill, house or field. The water tearing madly over the denuded rocks of a bare and arid declivity is his scourge and his destroyer.

In the first report of the extinct Board of Forestry a number of domestic and foreign instances are collected showing the damaging effect of undue forest denudation. Our brush or chaparral acts as a forest in delaying the delivery of the rainfall.

Some time before the abolition of the State Board of Forestry the friends of forestry in California concentrated their efforts on a national system of forestry. Colorado has gone hand in hand with us in this work and participated in the results attained. We have achieved something important. We have secured the adoption of a policy of making forest reserves. The Federal Government has reserved large districts of land on the western mountain watersheds for the first time for forestry purposes and called them forestry reserves. In California, south of Merced, the most important mountain watersheds are now Government forest reserves. The Government has also taken the first step in recognizing its duty of protecting the public forest domain. The Yellowstone reservation and the Yosemite with its large additions are now efficiently and cheaply guarded by small detachments of cavalry. The result of these patrols in preventing forest fires has been very marked, and has demonstrated that these wasteful and destructive forest fires were mainly due to irresponsible sheep-herders. The exclusion of these herds from the Yosemite addition ended the danger from fire.

These matters promise well for the gradual establishment of a self-sustaining, scientific forestry system for the United States.

Nowhere is a conservative system of forest management more important than in a country of steep mountains alternating with fertile plains. When to this condition is added that of alternating dry and rainy seasons, under which irrigation becomes an important agency in agriculture, we have paramount reasons for a forestry system.

We say in a general way that the more difficult it is to create or maintain forests on mountain watersheds the more important these become to preserve the perennial flow of springs and streams and to diminish or prevent floods and torrents.

The blue gum is still the most valuable addition to the forest flora of California. We have indeed demonstrated the superiority of *Eucalyptus Robusta* in situations exposed to the sea influence, on the one side, and the superiority of the *Eucalyptus Corynocalyx* (Sugar Gum) in resisting drouth on the other; but the Blue Gum is still king of rapid growth, available in most of the settled districts of southern California, quickly available for firewood, and eventually, in favorable situations, valuable as lumber. It is the tree giving the promptest results of any known in the State. It comes easily from the seed and gives the best results when planted small, and is therefore a cheap tree for forest planting. When some plantations of Blue Gums are made in favorable locations, say in a burnt-over redwood district or in any damp location on the central California coast, we may expect to get trees similar in grandeur to those of Tasmania, where the Blue Gum often surpasses 400 feet in height. It is not generally known that the Blue Gum is a close competitor for the glory of being the tallest known tree.

The introduction of insect pests, while introducing foreign plants, has been the cause of damage and injury to the State. Often this damage has far exceeded any possible benefit to he hoped for from the plant introduced. To obviate this, let me suggest the advantage of adopting the policy from which I never departed in introducing foreign plants to this State—that is, by the seeds alone. I have no knowledge of any insect whatever as ever following the distribution of forest trees grown from our examined seed. Such a policy would make little difference in time and result in much added security, not only to forest trees but apply to all other plants. I am decidedly opposed to the importation of nursery stock from any infected district, and I believe that every foreign district producing nursery stock should he deemed infected until proven otherwise.

The importance of forestry is a thing no Californian can afford to lose sight of. Every city, village, home, orchard and field in southern California is subject to damage or destruction by unwise forest denudation. Such destruction may come through diminished summer water supply or by excessive flood delivery of water or the creation of new torrents, as has already taken place in our section. With all our mountains bare, there is no place here that would he safe. Let us join, then, in advising our federal representatives on this vital matter.

A New Clayton Compound High Duty Air Compressor.

Builders who formerly manufactured a general line of machinery are now very largely devoting all their ingenuity and capacity to some one type which they have excelled in producing. The Clayton Air Compressor Works of New York, at that time builders of steam pumps and general mining machinery, introduced the first Clayton air compressor in 1871. The rapidly broadening field of usefulness for compressed air created a growing demand for high-class air-compressing machinery, and soon caused the Clayton works to discontinue all other lines and concentrate the entire capacity of their plant to the construction of air compressors. Since this time they have made this type of machinery their specialty, laboring constantly to attain a higher plane of general excellence and adopting every improvement that would raise the standard of their machines. Among the numerous special designs which they are continually placing on the market is a compound belt actuated air compressor, which we illustrate herewith.

This compressor is intended for experimental and other duties in which air is used under pressure as high as 500 lbs. per square inch, where it is preferred to operate the compressor by belt power.

Two parallel cylinders are employed as shown, as in regular pattern of duplex compressor, one cylinder compressing the air to 80 lbs. pressure and transmitting it thence through the cooler shown above the cylinders to the second or high-pressure cylinder, which completes the compression. The cooling apparatus combines the most efficient devices known for extracting the heat of compression from the air in transit, and the cylinders are surrounded with the latest improved water jackets for absorbing the heat of compression by an external circulation of water around the cylinders. The suction valves are of the poppet style and are designed especially for durability and tightness under high duty; they are equipped with the Clayton patent safety stems, absolutely avoiding the possibility of a valve falling into the cylinder, and reducing clearance space to a minimum by permitting the pistons to run close up to the cylinder heads. As an extra precaution the main valve stems are fitted with both flange nuts and jam nuts. The pistons consist of a series of metallic rings of a composition made especially for the requirements of the duty. The connecting rods, bearings, etc., are all in accordance with the latest steam-engine practice, and the entire machine represents the continued progress of the house. A similar design of steam-actuated compressor is constructed for operation by direct steam connection.

Another design of compressor recently brought out by the same makers is a triple compression cylinder compressor for liquifying carbonic acid gas, which has many excellent points.

Scientific Progress.

Do Species Exist?

Prof. David Starr Jordan, of Stanford University, lectured in this city last week on evolution. Darwin, said the lecturer, once wrote a monograph on barnacles in which he tried to describe all the barnacles in the sea. He wrote:

"This systematic work would be easy were it not for this confounded variation, which, however, is pleasant to me as a speculatist though odious as a systematist."

He could not depend upon his barnacles; they were always varying. After describing a set of forms as a distinct species, tearing them up and making them separate, and making them over again, I have gnashed my teeth, cursed species and asked what sin I had committed to be so treated.

While writing to describe many species, and at the Arlington Hotel, Santa Barbara, the floor of my room was covered with letters rejected because each new individual made the prior description useless.

The crucial test of the development theory is the fact—does one species change into another? Species generally means a kind. The word was used first about 146 years ago by Linnæus, who, in a sense, was the founder of modern zoology on account of his system of recording. In animals of a limited district, such as eastern Sweden, there is no difficulty in telling where one species leaves off and another begins. Differences may be simple, but they are constant and apparently permanent.

In the system of Linnæus there was no doubt as to species being a definite thing, and he says that there are as many species on the earth now as there were different forms created in the beginning, that each species had been separately created by the hand of God and had not undergone change. Linnæus did not know of extioct species, nor that comparatively only few species are left. Linnæus recognized the idea of variety dependent on geological limitations, climate, etc. In the genus homo he recognized homo sapiens, the aborlginal man, and homo troglodytes, the ourang-outang, and of the former he recognized five varieties.

Cuvier recognized that species uoderwent variations, and thought that modern species could have descended from extinct species. Cuvier thought that there were as many species of animals now as there were different formations created at the beginning of each geologic era, which he believed to be about fifty.

Lamarck in the Paris Museum ran across cases where a shell in one country would gradually undergo changes until it became something quite different and that these variations were just what they appeared to be on their face, modification by climate.

In the days of Cuvier the difficulty of the men who maintalned the descent of species was to show the things causing the change. Whatever the factors in evolution were not shown until the time of Darwin, Lamarck's exploration was not regarded as sufficient, though Goethe prophesied that the time would come when it would be valued as scientific. This is the conclusion reached by every one who has taken up the study of late years. The reason why it was not discovered earlier is that people neglected the little for the great, whereas the progress of science has been by the collation of small facts.

Darwin's study of the land birds of the Gallapagos islands, off South America, and also of the Cape Verde islands, off western Africa, the persistence of the same species and their resemblance to the anlmals of the continents led him to the conclusion that these birds were waifs of the storms that had taken root there and changed to match the changed surroundings. If you admit that new species can be found up on the islands you admit that one species can be formed from another.

In Australia the mammals are marsupials, the fossil mammals are marsupials, and the lecturer concluded the modern were descendants of the ancients. Shells that in the upper reaches of swift and rocky streams are rough, in the lower and calmer waters of the mouth become smooth, and the transition is so perfect that it is impossible to tell where the one leaves off and the other begins. From these and other data we conclude that time and space bring about changed conditions and forms.

One of the greatest movements in recognizing evolution of species was the Pacific railroad survey. Numerous plants and anlmals were taken to Washington from the greatest stretch along the same latitude line that had ever been known. The birds, etc., were subjected to Professor Baird's minute studies, and certain laws of variation were thence formulated. The paper of Dr. Joel Allen of Harvard on the mammals and birds of Florida in 1874 was a further step in the advance of our knowledge of species.

By means nf hundreds of measurements of specimens he discovered laws by which he could predict the kind of variations in birds in some new places about to be investigated in Florida, and showed that many of these variations were connected with climate. In spite of the early opposition to Allen's theories, ornithologists and others have come to the conclusion that the only test of species is the known presence of intermediate forms.

Illustrations of Professor Allen's laws were given in the shore lark, the blue birds, the meadow lark, etc. In regard to his own conclusion to that belief in evolution of species, Presldent Allen spoke nf his early training under Agassiz in opposition to Darwin's theories, and how he was forced by his experience to take a view contrary to that of his professor. He then explained how fish spread in different rivers, especially how the trout had come from Siberia and worked its way to the Frazer and Columbia rivers, to the Snake and Lewis rivers, to Utah, and by the Colorado into and through Dalifornia and up again to the Columbia and Frazer, where the two now recognized species of trout, the descendants of the original Siberian emigrants and the descendants of the trout that had migrated and spread over the western country, met and lived together as two distinct species.

The variation of words as shown in philology and the various species of anlmals is a very close parallel. There is just as much reason to believe that all the words of the French language were created separately in France, without any relation to Latin or Greek, as to believe in the independent creation of species.

What Keeps Up Natural Gas Pressure.

A docnment just issued by the Smithsonian Institution contains an article by Prof. Edward Orton on the natural gas supply of Ohio and Indiana especially, and the cause of the pressure which keeps up the flow of gas, even through mains 30 and 40 miles long.

He holds that this gas, which exists in the Trenton llmestone rock of a porous nature, is forced out of the rock by salt water which percolates through the rock, being held back by gas in its natural state until the gas pockets or cavities are tapped by wells, when, as the pressure is thus reduced, the water percolating through the rocks continues to keep up the pressure of gas through the wells and in the mains.

He finds that the salt water which is found beneath the gas usually rises in the wells to a height about corresponding with the level of Lake Superior, and his theory is that there is a connection between the water penetrating the porous rocks in which the gas ls found and that of Lake Superior, though it must at first pass over or through salt beds in order tn gain the salt qualities which it cnntains when found in connection with the gas fields. He argues that there is no danger that the great gas reservoirs of to-day will "cave ln" or "blow up" after the gas is withdrawn from them. The gas will not leave the porous rock until the salt water nbliges it to leave by driving it nut and takiog its place.

An Interesting Discovery.

Accident recently revealed to the managers of the Baltimore Copper Works a fact which may have some value in refinlng the metal there handled, says the New Ynrk *Tribune*. At this establishment the reverberating furnaces are connected with a great chimney by means of long underground passages, called "culverts," in which more or less oxidized copper, as well as sulphides, arsenides and other componnds, is carried off in the form of dust and smoke. These are deposited in the culverts, and are subsequently collected to be worked over again. Amld an accumulation of such stuff, a few days ago, there were found iridescent, moss-like masses which upon examination prnved to be pure copper. How the transformation was effected was a mystery, until it was discovered that petroleum, which saturated the soil in the vicinlty (having escaped from a neighboring refinery), had entered the culverts through a crevice. Under the influence of high heat it was volatilized, and the resulting gases had "reduced" the oxides and sulphides into pure metal. It is probable that this revelation will be turned to advantage in future operations.

Mechanical Progress.

The Campania and the Great Eastern.

In a paper nn "Fast Ocean Steamships," in *Cassier's Magazine* for December, Dr. Francis Elgar, a prominent English naval archltect, draws an interesting comparison between the famous Great Eastern and the latest type of modern ocean steamer as exemplified in the Cunard liner Campania. The Great Eastern is the most wonderful instance the world has seen of attempts to obtain high speed over long distances at sea. She was designed 40 years ago, and her name is probably associated in the minds of most people only with errors and disasters. It is universally known that she was remark- for her enormous size; but it ls often forgotten that there was anything else about her worthy of notice or admiration. Every new ship that is built of greater dimensions than her predecessors is naturally compared in size wlth the Great Eastern. The Great Eastern was remarkable, however, not only for the vastness of her proportions, but also for the extent to which problems relating to high speed upon the longest ocean voyages, some of which are at times thought to be peculiarly modern, were understood and worked out by her designer.

In the latter part of 1851, Mr. Brunel began to work out his idea of a great ship for the Indian and Australian trade. He spent two years in inquiries, investlgations and calculations relating to the numerous problems—many of them quite novel then, though more familiar now—that were raised by such a tremendous stride in advance of all former experience and ideas. The magnltude of the stride was as great as would now be involved by the construction of a ship 1200 feet long and of 30 to 35 knots speed.

The length of the Great Eastern, over all, was 692 feet, as compared with the 622 feet of the Campania, and her load draught was 30 feet, as compared wlth 27 feet of the latter. She had accommodations for 800 first-class, 2000 second-class and 1200 third-class passengers, while the Campania is able to carry 600, 300 and 700 passengers respectively. The propelling power of the Campania is fully 3½ times as great as that of the Great Eastern, and her speed is more than 50 per cent greater.

Riveting Pressures.

In a discussion by the Engineers' Club of Philadelphia, on the riveting pressures required for bridge and boller work, Mr. Wilfred Lewis referred to a number of letters received expressiog interest in the subject, and read a letter from Mr. David Townsend stating that he was prepared for the manufacture of rivets to be driven cold, a number of which were exhibited. In regard to the pressure required for driving such rivets, Mr. Lewis recalled some experiments made by William Sellers & Co., Incorporated, between the compression platforms of their testing machlne. A number of ⅞-inch rivets were subjected to pressures between 10,000 and 60,000 pounds. At 10,000 pounds the rivet swelled and filled the hole without forming a head. At 20,000 pounds the head was formed and the plates were slightly pinched. At 30,000 pounds the rivet was well set. At 40,000 pounds the metal ln the plate surrounding the rivet began to stretch, and the stretching became more and more apparent as the pressure was increased to 50,000 and 60,000 pounds. From these experiments the conclusion might be drawn that the pressure required for cold riveting was about 300,000 pounds per square inch of rivet section. In regard to the pressure for hot riveting, he said that until quite recently, within the last decade, there was never any call for a pressure exceeding 60,000 pounds, but that now pressures as high as 150,000 pounds were not uncommon, and even 300,000 pounds had been contemplated as desirable.

A Remarkable Locomotive.

On one of the Kentucky railways is a remarkable little locomotive. It is described by an exchange as having eight wheels, all drivers, but the length of the wheel base, or distance between front and rear axle, is only 16 feet. It weighs but eight tons, being designed to work on steep grades and curves, and has hauled a train of four empty cars, weighing 16,000 pounds, up a grade of 600 feet to the mile and around curves of 50 feet radius, where the grade was 450 feet to the mile, at a speed of 12 miles an hour. It has but one pair of cylinders, which are rigidly attached to the middle of the frame and the wheels are carried under two trucks, one at each end and both able to turn about a center pin like the trucks under passenger coaches. The front and rear axles—that ls the first axle on the front truck and the last axle on the second truck—are hollow, the diameter of the inside being sufficiently large to permit a second axle to run through, the connecting rods driving these interior axles by means of crank pins, and the motion is communicated to the tubular axles by universal joints at their center point. In this manner the inner and outer axles are not always parallel, but the rotation of the former forces the latter to revolve with it. The tubular axle carries an annular crank from which the other wheels on the truck are driven. As the cylinder is midway between the trucks, there is a piston rod on each face of the piston, and the forward stroke for the wheels under the front of the engine ls the back stroke for those in the rear.

Boiler Coverings and Fuel.

The influence of boiler coverings on the consumption of fuel has lately been tested on the railways of southwest Russia, says the Chicago *Journal of Commerce*, and it was found that the cooling was more rapid while working than when stationary, save when a double covering of felt was used. It is reported that the heat in 24 hours by a boiler with 30 square meters of surface containing water at a temperature of 144 degrees and exposed to an exterior temperature

of 8.5 degrees corresponded to 133 kllos. of coal if the boiler was uncovered, to 153 kilos. If there is a thin metal covering, to 130 kllos. in the case of a cork covering. The cooling of the boiler represented about 24 per cent and 8.1 per cent out of an average daily consumption of 1164 kilos. of coal.

New Smokeless Powder.

Plastomenite is the name given to a new kind of smokeless powder invented by a German, Herr W. Guettler. The solution is poured into forms, where it becomes a fairly hard substance, capable of being pressed, rolled, etc. The substance can be colored at will, and is, like celluloid, serviceable for numerous purposes. Plastomenite is used for blasting powder, powder for cannons and rifles, signal rockets, etc. The greatest advantage claimed for it is complete durability, while all other smokeless powders manufactured by the means of ether and nitroglycerine deteriorate. The combustion of plastomenite is also, it is claimed, so well balanced that it leaves no residue in barrel or cartridge, although the striking velocity of the projectile is unusually great. The initial velocity from a 6½ mm. caliber is 715 m., with a gas pressure of considerably below 3000 atmospheres. It is said that neither cold nor hot weather has any effect upon the plastomenite cartridges, whereas all powders containing nitro-glycerine suffer from changes in the temperature. Hitherto plastomenite has principally been manufactured for sporting purposes, but its good qualities have attracted the attention of the German military authorities, and will now be extensively tested in the army.

Compressed Air for Street Roads.

Compressed air is again about to be tried for street railway traction in Paris by the Compagnie des Omnibus, which will shortly run a line of cars, worked by compressed air, from the Louvre to Versailles and St. Cloud, and also upon a connecting line now under construction from the St. Augustin Church to Vincennes. Upon the first-named road the motor cars will be of 18 tons, and, being worked by air under pressure of 1000 pounds per square inch, they will be able to draw two or three trail cars, each containing 50 passengers, or even more whenever there is a rush of traffic. Upon the new line from Saint Augustin to Vincennes single cars will be run, containing at the same time the compressed air, the motor and about 50 passengers. The cars upon both lines will resemble those at present in use, except that the top will be covered in.

Extensive Pneumatic Tube System.

The most extensive pneumatic tube system in the world, probably, is that which has recently been completed at Chicago. It extends from the headquarters of one of the great press news agencies to nearly all of the daily newspaper offices, and is to be used exclusively for sending messages to and from said offices. About 17 miles of brass tubes three inches in diameter were used.

New Steel Process.

The diamond-making experiments of Moissan have suggested to M. Jules Garnier a new method of producing steel that he expects will revolutionize the steel industry. The process is claimed to have been satisfactorily tested. The steel is said to be made instantaneously by placing a bar of iron and a stick of charcoal together in an electrical firebrick furnace and subjecting them to a strong current.

A Tall Chimney.

The Brooklyn City Railroad Company has just completed at its plant a smokestack 293 feet high, 38 feet and 3 inches at the base, tapering toward the top and surmounted by a five-ton iron cap. The inner core or chimney proper contains 63,800 cubic feet of air space. The chimney will take the smoke and gases of 36 500-horse boilers using forced draught.

This stack is one of the largest in the country. It rests upon a foundation of 14 feet of stone and 9 feet of concrete supported by 1201 piles. Some 2,000,000 bricks are used in the work of construction.

New Fire Alarm.

A novel fire alarm has lately been produced in France. It consists of hollow sphere of aluminum supported at one end of an arm, with a counterpolse at the other end, the two being arranged to balance at the ordinary temperature and pressure of the air. The apparatus is not sensitive enough to record natural changes of pressure, etc., but if some unusual cause, such as fire, or even a large accumulation of coal gas in the atmosphere, disturbs the specific gravity of the air, the ball drops and rings an electric alarm in falling.

The Best Mining District
On the Pacific Coast!
GRASS VALLEY, CAL.

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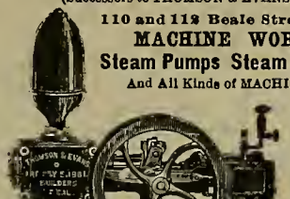

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Electricity.

The Trolley for Canals.

The attempt to use electricity for propelling canal boats near Rochester was a distinct success; but technical journals regard it rather as a popular exhibition than such a scientific test as would determine all the questions involved in this great enterprise. These, in view of the importance of moving great quantities of bulky freight cheaply, are now receiving careful consideration from competent persons.

The *Electrical Engineer*, for instance, calls attention to the extra resistance offered by shallow water to the passage of boats, and the increase in the reqnired power, in a geometrical ratio, for every increase attained in speed. Hence that paper urges that the canals of New York State be deepened to nine feet without delay.

In the *Engineering News* it is suggested that a flexible cord or cable should be substituted for a stiff pole, to bring the current down from the trolley wheel, to the motor in the boat. This would make it easier to maintain connection with the supply wire when the boat drifts sideways. The belief is expressed, moreover, that two wires may prove unnecessary, and that the return current can he handled by sending it into the water through a suitable "ground" plate in the bottom of the boat. Still another idea brought forward by the *Engineering News* is that the motor might be so constructed as to ride on the overhead wire (or cable), and to take hold thereof so as to tow the boat. This would involve more expensive overhead construction, but it would render a screw propeller unnecessary; and, although the latter device is already made to work fairly well by steam-power on craft of this character, there are objections to it that have not been overcome. If a screw must be used, though, a large one, moving slowly, or twin screws, which could be smaller and more easily submerged, are considered desirable. The extra cost incident to the employment of special tugs, instead of motors on each boat, is deprecated by experts.

Another point needing consideration and experiment is the feasibility of "turnonts" for boats meeting and passing each other, adds the New York *Tribune*. On street railways it is easy to have the cars meet at specified points, but whether boats can he rnn on a schedule or not is quite a different question. Whether one, two or four overhead wires are necessary is yet undecided.

Damage by Lightning.

Writing to *Industries*, Mr. A. A. Voysey gives an account of an apparently unusual cause of damage by lightning. In a room in a country honse near Nottingham stood a table "ornamented by a fringe fastened securely to it hy nails. This fringe had been almost entirely burnt on the side of the tahle facing the room, and the burning had partially extended to one other side. The wood was charred to a depth of one-eighth to one-quarter of an inch where the fringe was hurnt. If the table had heen struck hy lightning, there must have heen some marks in the room showing where the discharge had entered and where it passed to the earth. But not a mark or sign of any kind could he found, and the damage to the tahle was completely isolated. A rigid inquiry proved that no one had entered the room with a candle. The only possible explanation of the occurrence was suggested hy an examination of the fringe. It was found to consist of a fluffy material, probahly a mixture of cotton and wool, and certainly of an inflammable nature. Interspersed among the fluffy material were fine metallic threads. Now, it is in this combination of inflammahle material with the metal threads that the explanation lies. The metal threads were acted on inductively by the lightning discharges taking place near the house. This inductive action was sufficient to cause small sparks to fly between various threads, and the sparks set the inflammable material on fire. If the fire caused in thls peculiar manner had not quickly died out, the whole house might have heen destroyed, and no sign would have been left to point to the true cause. It is not unusual for fires to occur in connection with thunderstorms, and they are generally attrihuted to the direct action of a lightnlog discharge. Possibly a large percentage of such fires have been caused by induction, and the simple incident which has come to my notice is sufficient to show how easily the inductive action may cause a fire."

A Monster Engine.

The Dickson Manufacturing Company of Scranton, Pa., has just completed a monster engine for the Edison Illuminating Company of New York city. The engine weighs 400,000 pounds and is of 2500-horse power. It required ahout one year to put this great piece of mechanism together, and now employes of the company are taking it apart, marking each portion so that the machinists who set the engine up in the plant of the Edison Company in New York will know just where each piece helongs, and packiog in boxes the smaller parts of the engine. It is thought that the eogine will be ready for shipment very soon.

The engine is what is known as a quadruple-expansion engine of the Van Vleck pattern. It has two crank tandem cylinders, one of high pressure and one of low pressure. The dimensions of these cylinders are 26x37, 52 and 72x36. The engine will be capable of making 90 revolutions a minute. The gearing is what is known as Joy valve gearing, with piston valves controlled by hydraulic governors. The crank shaft is a steel forging and weighs, of itself, 30,000 pounds. Armatures are to be placed on each end of this shaft when the engine is placed in position in the electric-light works.

Rail Heating Device.

A novel method of removing snow and ice from electric railway rails, or of preventing its formation, has recently been patented by Charles S. Smith and E. E. Knowles of Spokane, Wash. It consists of electrically heating the track rails by a device adapted to be placed in the body of the rail in such a manner that the heat produced by the passage of the current will be conducted to the tread of the rail to melt any ice or snow which may be there.

The heater consists of a rod of porcelain, or some other insulating material, provided with a helical groove in which is wound with a conductor one terminal of which is connected with the line and the other with the rail or earth. This rod heater is accommodated in a circular hole in the head of the rail and running longitudinally for its entire length, or in a special heating plate adapted to be secured to the rail. The exact position of the opening is, of course, immaterial so long as the heat supplied is transmitted to the tread of the rail, though the nearer the opening is to the tread the more efficient will be the device.

Massage and Electricity.

A singular attribute of massage is noticed by Dr. A. Symons Eccles, who has discovered that it indisputahly decreases, in a marked degree, the resistance of the skin to the passage of electrical currents, says the *Electrical Review*. In this way the number of cells necessary in order to pass a given quantity through the skin, in cataphoric and other treatment, can be reduced and a great economy of electricity effected. Dr. Eccles suggests that where the alternating constant current is used for the purpose of percntaneous medication by satnrating the electrodes with a watery solntion of the substance selected for use, the effectiveness of the applicatlon will he materially increased hy preliminary massage; the drug will he more rapidly absorbed just as surely as the resistance of the tissues to the passage of the electric current will be reduced. The science of cataphoresis, or the driving into the tissues by the application of electric currents of drugs or medicines, by which many injured parts can be treated that otherwise could not be reached, is now largely brought into requisition, both in hospital and private medical practice, and. Dr. Eccles' discovery is likely to greatly increase its efficiency.

Useful Information.

How to Live a Century.

First, live as much as possible out of doors, never letting a day pass without spending at least three or four honrs in the open air, says *Medical Age*.

Second, keep all the powers of mind and body occupied in congenial work. The muscles should be developed and the mind kept active.

Third, avoid excesses of all kinds, whether of food, drink, or of whatever nature they may be. Be moderate in all things.

Fourth, never despair. Be cheerful at all times. Never give way to anger. Never let the trials of one day pass over to the next.

The period from 50 to 75 should not be passed in idleness or abandonment of all work. Here is where a great many men fall. They resign all care of interest in worldly affairs, and rest of body and mind begins. They throw up their business and retire to private life, which in too many cases proves to be a suicidal policy.

During the next period—the period from 75 to 100 years, while the powers of life are at their lowest ebh—one cannot he too careful about catching cold. Bronchitis is a most prolific cause of death in the aged. During this last period rest should be in abundance.

Anybody who can follow these directions ought to live to be 100 years old at least. There is always this comfort, however—if we cannot live up to our ideas always, we can at least try our best to do so, and the steady effort will be brioging us constantly nearer them.

Death Rate of Large Cities.

Statistics are given below compiled for the first half of this year by Secretary Carter, of the Maryland Board of Health, showing the mortality in various cities of this country and Europe having a population of more than 100,000:

	Population.	Deaths.	Death rate per 1000.
London	5,849,104	55,895	19.11
Paris	2,424,705	28,675	23.61
New York	1,801,739	23,855	26.47
Berlin	1,869,124	17,181	20.58
Chicago	1,458,000	13,590	18.95
Vienna	1,435,931	18,005	25.07
Philadelphia	1,116,562	12,249	21.95
Brooklyn	978,394	10,685	21.84
St. Louis	520,000	4,802	18.47
Brussels	488,188	4,359	17.86
Boston	457,397	5,816	23.88
Baltimore	455,427	4,806	21.10
Dublin	349,594	4,736	27.05
San Francisco	330,000	3,006	18.21
Cincinnati	305,000	3,000	19.67
Cleveland	290,000	2,688	18.19
Buffalo	290,000	2,361	16.28
Pittsburg	255,000	2,923	22.92
New Orleans	254,000	3,698	28.72
Edinburgh	267,000	2,572	19.22
Milwaukee	250,000	2,000	16 00
Louisville	227,000	1,630	14.30
Minneapolis	209,000	1,004	9.60
St. Paul	156,000	746	9.61
Christiania, Norway	166,500	1,385	17.75
Denver, Colo	150,009	871	11.61
Rochester, N. Y	144,884	1,291	17.87
Reims, France	105,408	15,03	28.62

The Human Family.

The human family living on earth to-day consists of about 1,450,000,000 persons in round numbers. Of these only ahout 500,000,000, or one-third, are even properly clothed; 250,000,000 habitually go naked; 700,000,000 have only the middle part of their hodies covered; only 500,000,000 live in houses, 700,000,000 in huts or caves, while the remainiog 250,000,000 have no home or sheiter whatever.

World's Fair Passenger Business.

Under the caption, "How They Got Here," the Chicago *Inter Ocean* prints the following as the amount of passengers carried to the city by the various roads:

Chicago, Burlington & Quincy	2,300,000
Chicago & Alton	250,000
Northwestern	2,700,000
St. Paul	622,000
Michigan Central	350,000
Chicago & Grand Trunk	367,903
Santa Fe	88,618
Baltimore & Ohio	581,500
Illinois Central	250,000
Fort Wayne	542,000
Pan Handle	186,100
Wisconsin Central	53.174
Chicago & Erie	295,000
Rock Island	600,000
Wabash	200,000
Great Western	50,000
Monon	100,000
Lake Shore	270,000
Nickel Plate	50,000
Chicago & Eastern Illinois	60,000
Total	9,916,295
SUBURBAN LINES.	
Illinois Central	18.178,893
St. Paul	6,750
Burlington	2 760,000
Baltimore & Ohio	500,000
Northwestern	1,800,000
Rock Island	600,000
Lake Shore	540,000
Total	24,385,643
LOCAL LINES.	
South Side	94.000,000
North Side	36,501,394
West Side	60,000,000
South Side Elevated	22,248,779
World's Fair steamships	3,000,000
Total	215,750,173

How Coke Is Made.

The process of producing coke is thus described: Ovens in the shape of beehives are huilt with an opening in the top and a small door in front. After the fires have once heen started in the ovens, the hricks retain sufficient heat to ignite each subsequent charge of coal. The coal goes in through the opening at the top, the door below is sealed with firebrick and clay, and in a very short time the coal becomes heated to a liquid mass. It remains in this state two or three days. All this time a fierce flame is pouring out of the opening through which the coal entered, hut it is only the gases and other volatile matter that are passiog away, as the flame prevents the introduction of air, and the carbon—the greater suhstance of the coal—will not burn without oxygen. Thus in time all noxious gases, such as phosphorous and sulphur, which would enter into and injure the product of the ores in smelting, are lost, and only the carbon is left. About a third of the coal is consumed in this process. When it is time to draw the oven, the bnrning coal is drenched with water, and as it cools, it cakes and cracks from the contraction of the cold. It is then drawn, and is ready for use.

New Way to Fell Trees

Trees are felled by electricity in the great forests of Galicia. For cutting comparatively soft woods, the tool is the form of an auger, which is mounted on a carriage, and is moved to and fro and revolved at the same time by a small electric motor. As the cut deepens, wedges are inserted to prevent the rift from closing, and when the tree is nearly cut through, an ax or hand-saw is used to finish the work. In this way trees are felled very rapidly and with very little labor.

Comfort and Decoration.

The fact is, decoration may be good, hut comfort is always the most precious element of home life, says the New York *Recorder*. Some of the effort expended in hand-painting hroom handles would go a long way, if properly directed, toward giving people a thimbleful of hlack coffee in bed in the morning.

A jug of hot water, as a matter of course, without effort, every morning—what a neces-

sity to comfort that is, and how many families have plush hanners till they can't rest, and never see a drop of hot water outside the general hathroom, except they make violent and nnseemingly excursions after it at strange honrs and in weird costumes.

The proper receptacle for it, hy the way, is not a jug at all, hut a tin can with a spout, a handle and a cover.

Why not, if you love to do things for your honse, have as many of these cans made as there are hedrooms in your house? Have it done on the pattern of the cans that come with tin foot-haths, only ahout half the size. Have them painted to match your rooms, if you love a dainty finish to your arrangements.

All the worked mottoes and scripture texts you can hang on the walls are not so conducive to sweet piety on a hot night as a pitcher of ice water.

Every one can get and always does get it in a hotel—how sad to so often languish for it in a guest chamher! And how little comfort, while one languishes, is the cross-stitch pnrple needlework dog with head eyes on your footstool.

Guest chamher and torture chamher are too frequently synonymous terms anyhow.

To run around with a match hurning your fingers hecause there is no place to throw it—who hut a guest experiences that particular form of painful lunacy?

For, of course, he could hiow the match out, hut he's so confused hy the absence of an accustomed receptahle for it that he loses his head and a portion of his cuticle, and finally puts it in the slop jar, whence it gets into a drain pipe and hrings woe to everyhody hut the plumher.

These hints indicate a field for household decorations lying all too fallow.

A little decoration of daily life with ease-hegetting arrangements is more needed than all the rihhons that ever tied up kindling wood or floated from enameled wooden spoons.

Tobacco Displacing Cotton.

The president of the National Cigar Leaf Growers' Association (at Lake City, Florida) expresses the opinion that tohacco culture is the coming industry of South Georgia and Florida. In his opinion there will he 5000 farms in the localities indicated planted in tohacco next year that are now planted in cotton. They are growing fine grades of cigar tohacco, equal or similar to the Havana article, in the sandy lands of South Georgia and the hordering counties in Florida, and the profits have proven attractive so far, causing wide-spread interest and a rapid extension of the acreage. With more experience and care in curing the crop and its more general cnlture in the district referred to, the competition among the tohacco huyers resulting will make the returns to the growers very profitahle. Prominent citizens of Lexington, Kentucky, are among the large investors in tohacco planting ahout Chipley, Florida.

Alnminnm Paint.

A recent issue of the *Revue de Chime Industrielle* contains an article on aluminum paints. Aluminum, when reduced to powder, and mixed with a solution in water of gum-lac, gives a metallic paint which covers well, and may he shaded with aniline colors dissolved in water. The solution of gum-lac is made hy hringing to hoiling polnt a mixture of gum-lac and horax and an alkall such as soda or ammoniac. The solntion must contain at least from 15 to 20 per cent of gum-lac. Aniline colors are added to produce the shade desired, and aluminum is added in sufficient quantity to produce a paint sufficiently fluid for application with a hrush. The color is hrilliant, very durahle and impermeahle, and may he applied to metals, paper, wood and woven materials. It may he rendered supple hy the additlon of a small quantity of glycerine.

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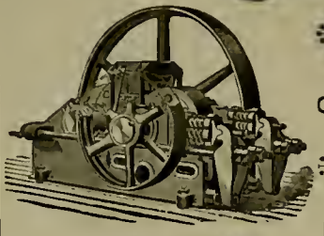

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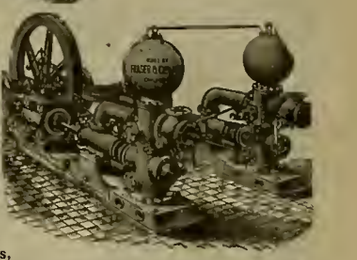

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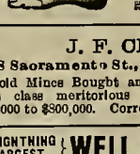

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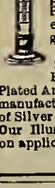

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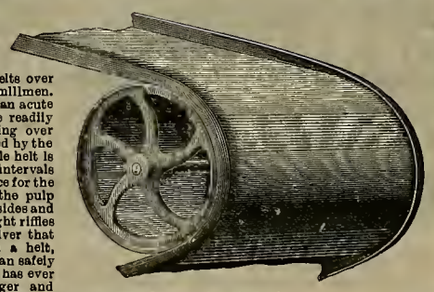

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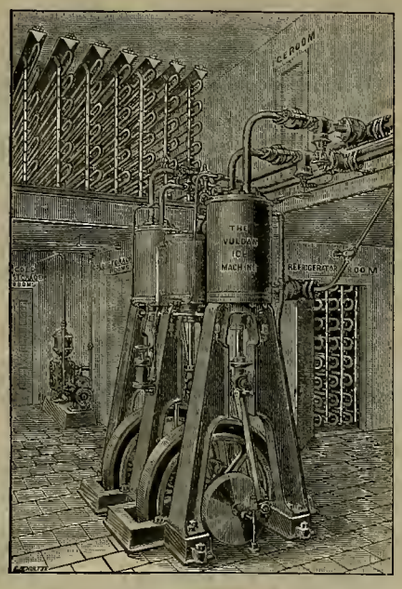

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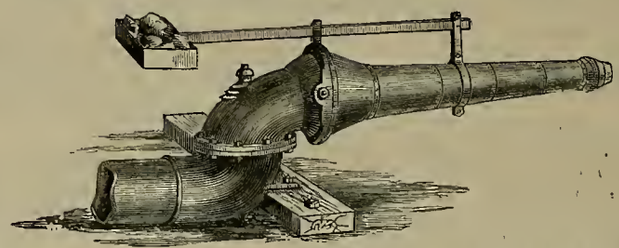

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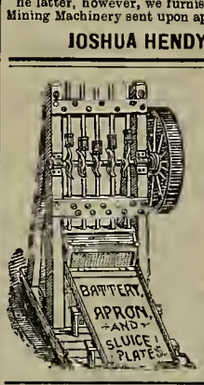

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Coast Industrial Notes.

—The Montana National Bank at Helena has reopened.

—An electric railway is to be built between Pomona and Claremont.

—Richard Gird, the Chino capitalist, is about to build a fine brick school-house for Chino.

—Government surveyors are surveying public lands between San Bernardino base line and the Mojave desert.

—The merchants of San Francisco have subscribed $73,000 of a $100,000 guaranty fund for the North American Navigation Co. The remainder will be raised.

—There is an immense deposit of beautiful gray sandstone about ten miles southwest of Kingman, near the line of the Atlantic & Pacific Railroad that will some day be used for building purposes.

—The Washington (State) capitol Building Commission has received plans for the building to the number of 173. The Commission has concluded to place the plans in convenient form for examination.

—Healdsburg and Petaluma capitalists are agitating the question of connecting the two places by means of a wide, shallow canal, which will float lighters. It is designed by this means to get cheaper transportation for freight.

—"Wheat driers" are being erected at Oakesdale, Wash., where the cereal damaged by rain and floods can be restored to a commercial condition. It is claimed that damaged grain thus treated can be converted into No. 1 shipping wheat.

—The receivers of the Northern Pacific Railroad have taken steps to secure terminals for that road at Seattle. They have an option on the property of the Seattle Transfer Company, and notice of the purchase was recently served on that company.

—A company has been organized in Washington State to compete with the present telephone company. They will use the new system, which does away with the central office, as each subscriber can make his own switches. The price for the rental of boxes will be $2 50 per month.

—James L. Flood denies that either he or Mr. Mackay proposes to spend any money in developing coal beds in Mendocino county. It is understood that Mr. Flood's objection to working the mines owned by himself and Mr. Mackay is that the nearest points from which shipments could be made, Ukiah, is 60 miles away.

—Articles of incorporation have been filed by the Oakland Water Company. It purposes furnishing Alameda county with water. The capital stock is $3 000,000; of this $32-000 has been subscribed. The directors for the first year are: Alvinza Hayward, A. W. Rose, Jr., William J. Dingee, H. G. Stevenson and W. E. Snell.

—The next steamer that sails for Honolulu will have in her cargo a steam-plow plant, which is expected to revolutionize the present method of cultivating the great sugar plantations on the islands. The plant is for the plantation of R. Wilcox, on the island of Oahu, and consists of boiler and engine, cables, etc., and a 12-plow machine capable of plowing 50 acres a day. The machinery is in charge of George Carter, an expert machinist from Leeds, England, who will put the plant in working order on Mr. Wilcox's plantation. The steam plows will take the place of the horses now used to perform the same work, and are expected to go far toward cheapening the cost of production.

—The bankrupt Oregon Pacific road was bought last week, under the hammer, for $200,000 by representatives of the Blair faction of stockholders. The employes and other creditors of the Oregon Pacific have sent protests to Judge Fullerton asking him not to confirm the sale. They have legitimate claims against the property for about $350,000, and when the expenses of the courts, receiver and advertising, which lawyers claim must be paid first, are taken out of the price for which the property was sold, the laborers fear that they will receive but a small percentage of their claims. It is claimed that at the lowest reasonable estimate the property is worth $500,000. It is thought that Judge Fullerton will refuse to confirm the sale.

—The New City Hall Commissioners have adopted Architect Shea's plans and specifications for the completion of the great central rotunda, which will cost about $340,000 and give employment to several hundred skilled workmen and laborers for fully a year. Owing to the complexity and magnitude of the work, the secretary of the commission has been instructed to formulate advertisements calling for bids upon a part or whole of the work. Preference is to be given to materials of domestic manufacture. The commissioners will hold a special meeting in order to pass upon the terms of the invitations for proposals, and the steel, iron, terra-cotta, copper and other dealers in tower material will have a chance to inspect the specifications and submit figures for furnishing the crowning piece to the great gray hall.

—The big Coos Bay cigar-shaped raft went to sea Saturday afternoon without a hitch in any way. Captain Magee was placed in charge of the raft about ten days ago. He immediately went to San Francisco and procured the steamer National City for a tow boat. He took on 250 tons of coal from Newport, made a few necessary repairs to the raft, and with her in tow at flood tide took her safely out. This starts a new industry at Coos Bay, as this county abounds in piles and other kinds of timber that can be taken to San Francisco quickly and cheaply. There has been a good depth of water on the bar all winter, and the National City found 22 feet when she crossed. The raft contains 3315 piles of an average length of 70 feet. The raft is 620 feet long. It is thought it will reach San Francisco in a week if the weather is favorable.

—The joint irrigation dam of the Modesto and Turlock irrigation districts, across the Tuolumne river, near La Grange, was completed Dec. 13th after two and one-half years' work. It is claimed to be the highest overflow dam in the world, being 127 feet high. At the base it is 117 feet thick, and at the top 15 feet. It is in the shape of an arch, and is 236 feet across at the top. The cost was about $550,000. It contains 38,700 cubic yards of masonry, and 31,000 barrels of cement were used. The dam will supply water to 276,000 acres of fertile, level land in the two irrigation districts in Stanislaus county. The canals upon both sides have been partially finished, the total work so far costing $1,800,000. The dam is also intended to furnish power by electricity for manufacturing purposes. Two million dollars in bonds have been voted for the enterprise.

—The continuation of the cable line from the present terminus of the Sacramento-street line, in this city, is nearing completion. This is to run from the intersection of Sacramento and Walnut streets to Lake street, thence to Sixth avenue, and along Sixth avenue to D street, a distance of about four miles. This leads directly to the Midwinter Fair grounds. Manager Stein thinks this is the quickest job of cable-road building ever attempted in this city, the time occupied in the operations being only about six weeks. An army of men is still at work, 60 scrapers with four horses each being engaged in one fill. It is expected that the road will be open for business soon after the first of the year. The cause of haste in putting in the road was that the company's franchise was about to expire, and it became necessary for them to have the line completed by Christmas, which they say will be practically accomplished, though no passengers will be carried until a fortnight later.

—In the near future the Southern Pacific Company will make an important extension of its coast division line. One branch of this division at present terminates at Tres Pinos, in San Benito county. The proposed extension will carry the road south through the mountains and several large fertile valleys to a point opposite Alcalde, Fresno county, and thence east into Alcalde, where it will be joined to the Goshen branch of the Southern Pacific. Another short road will be run easterly through the hills from Kings City, thus uniting the Paso Robles branch with the proposed road. One of the most beautiful sections in southern California will be tapped and have an outlet to the east over the Goshen route and two outlets to San Francisco by the way of Hollister and by Kings City. The survey has already been made, and it will not require an immense amount of work to complete the construction of the proposed branch. The opening of this road will be of great importance to the building trades in this section.

Complimentary Samples.

Persons receiving this paper marked, are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, $3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

The importance of this powerful agent—public opinion—for the prevention of injurious acts is too obvious to need to be illustrated. If sufficiently at command it would almost supersede the use of other means.—James Mill.

Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

A NEW FOREMAN.—Amador *Ledger*, Dec. 15: At the Gover mine, S. H. Hoskins has resigned his position as foreman, and has been succeeded by Wales Palmer, who has been duly installed to fill the responsible position. Wales is a Native Son, and has been identified with mines and mining ever since he was 12 years of age. He is the oldest son of John Palmer, the pioneer mining man who has been superintendent of several mines in this State and the Treadwell mine in Alaska. The shaft at the Gover is now down nearly 1400 feet, the vertical depth of the lower level being 1000 feet. The last clean-up proved the best during the history of the mine, all the rock crushed being taken from the lower levels which are being fully developed at present, and which proves as in all paying mines in Amador county that from the lower levels comes the sought-for metal. A new electric pump capable of throwing 20 miners' inches of water is expected to arrive in about three weeks, which will be placed at the 700 level, and the one now at that station will be put at the 1000 dam. As soon as they are in good running order, they intend to run the shaft 200 feet deeper. Between 50 and 60 names are on the pay-roll at present. The timbers are already framed for the sawmill and the timber framer. Enough timbers, poles, lumber, wood, etc., are now on hand to last until late in the next summer, and all the contracts have been filled.

M. A. Hurley, president of the Horley Gold Mining Company, which owns and works the Lone Star mine near West Point, came up from the city on Monday in company with A. V. Oliver and Mr. Webster. Mr. Oliver is going to take charge of the Lone Star mine as superintendent. Mr. Webster, the present foreman of the mine, is soon going to leave, and the vacancy will be filled by Wm. Watt.

M. Hultaddo and J. Bales, who have been mining near Middle Bar, took out on Thursday 100 pounds of black metal which is spiked with gold. The quantity of the metal in the pocket which they struck is unknown.

J. B. Francis, superintendent of the Alma, who has been in San Francisco for several weeks on business connected with that property, returned to Jackson a few days ago.

The middle bar shaft of the Albany property has been thoroughly cleaned out, and sinking will now be continued.

Everything seems to be quiet at the La Jolla at Drytown.

LEASED THE SPANISH.—Enterprise Cor. *Record*: Messrs. Miller and Aden have leased the old Spanish mine on the Ballard & Martin tract, and are taking out some fine ore, which they intend to have crushed in Mr. Heald's mill at Nashville. This mine was worked in early days by Mexicans, who used the primitive style of the arrastra, and reports are that some of the ore was of fabulous richness. In prospecting in this old mine, Mr. Aden thinks he has struck the original chute of ore that the Mexicans were working, and, from what I can learn, the ore they are taking out is of very high grade, and the boys are confident they have a small bonanza in sight.

Mr. Holbrook, a San Francisco broker, was here yesterday looking over the locations on the mother lode, but more particularly the Montezuma mine, which is situated on the great foothill lead of the mother lode, north of the Havilla mine.

Everything is working satisfactorily at the Bay State mine. Their concrete bulkhead is keeping the water back from the shaft in good shape, and the sinking will be comparatively dry. The surface water coming down the shaft is caught in a temporary dam on the station and raised from there in tubs. Superintendent Jones and his foreman have accomplished a difficult job, and they may well feel proud of their success when it is taken into consideration that there is a pressure of 110 pounds to the square inch to work against.

Calaveras.

A HYDRAULIC MINE.—*Chronicle*, Dec. 16: The work of fitting up the North Star mine for hydraulicking purposes is progressing rapidly. A two-foot flume 28000 feet in length has been put in, 700 feet of 11-inch pipe laid, and a fine building 16x30 erected. The water will be taken from the Mokelumne & Campo Seco canal, under a 200-foot pressure, and the supply used will be about 400 inches per day. The work is being done under the supervision of Mr. C. M. Burleson of this place, a practical miner and an experienced man in this kind of work.

THE SANCHO.—*Chronicle*: Some samples of rock from the Sancho mine are very rich. This mine, which is owned by John Sancho and James Garavanti, is situated in the Gwin mine district, about 1½ miles from the Mokelumne river. A tunnel has been run in a distance of 80 feet on the ledge, which taps the vein at about 100 feet from the surface. The vein at this point is 12 feet wide, and the rock taken from it assayed $4.50 in free gold, while the sulphurets went as high as $70 per ton. The vein is undoubtedly the mother lode, as the rock is of the same character as that found in the famous Utica mine at Angels and the Kennedy mine in Amador county.

Kern.

NEW FIELDS.—Los Angeles *Herald*, Dec. 19: The recent gold discoveries in the Goler and Red Rock districts northeast of Mojave, have caused great excitement throughout southern California, and the emigration to those places is so large that it looks as if a big town would be developed in short order.

This morning a *Herald* reporter feasted his eyes upon a $1000 worth of gold nuggets which had been brought from the new "diggings" in the Goler and Red Rock districts, 28 or 30 miles north of Mojave. If the present indications hold out according to expectations, that region will soon become a second El Dorado. It is now assuming the character of an old-time California mining camp. The new "finds" are now paying from $6 to $20 per man, while many of the older claims are panning out many times that amount. As is the case in all new mining camps, claims are becoming scarce but prospecting more plentiful.

Considerable excitement marked the discovery of gold in the Goler region eight or nine months ago, and many people flocked to the new camp. A party of San Bernardino prospectors stole a march on many of the gold-seekers. To avoid giving out the object of their mission, the party passed through Mojave at night, and began work at the mines before it became generally known that gold existed in large quantities. The Goler mines have been almost continually worked since last August with good results. Over $25,000 has been taken from the diggings at Goler.

W. C. Wilson of Mojave has bought and sold over $6000 worth of nuggets from that district. The rest has been shipped direct to the mint at San Francisco.

One of the best paying mines at Goler is the Bald Eagle, No 1, owned by Gus. Hagg and A. Johnson of San Bernardino. A shaft 35 feet in depth has been sunk, and over $2000 worth of coarse gold and nuggets has been taken out. The "drift" is excellent. Another shaft is being sunk. Mr. Johnson declined to say what was being taken out each day, but it was evident that he and his partner have a bonanza.

The Beeson Bros.' claim is panning out well. It is in shallow diggings from six to ten feet. A nugget from this claim in the the possession of W. C. Wilson at Mojave weighs $280, another $145 and another $66.50. The larger one was picked up in Nugget Gulch.

Charles Sherman, a newspaper man who went into the camp Sunday, purchased a large nugget for $147. From the looks of things such finds are of frequent occurrence.

Three bottles of fine gold and nuggets were exhibited by Mr. Wilson. The yellow stuff came from Goler and amounted to over $400. Besides the claims mentioned numerous others are being worked successfully. A large number of certificates from the San Francisco Mint show the gold to pay $17.77 net per ounce, which is considered big money.

The Red Rock district is turning out considerable gold. A miner who has been working the district since it was opened six weeks ago claims that no less than an ounce of gold is taken out by each man. Three men took out 15 ounces or nearly $300 in one day, but this was the luckiest day encountered. The gold here is coarse, some of the nuggets weighing as high as $8 and $10. These valuable chunks of gold are growing scarcer as the days wear on, but pay dirt is found all the time. Dry washers are largely used in taking the gold out.

Red Rock is a very flourishing camp and is on the road to Globe and the Summit district.

The Sommit claims were located only four or five days ago and are situated on the elevation dividing the Mojave country from the region opening into Death valley. The south end of the famous Valley of Death can be seen from the last discovered diggings called Summit.

The new find was located by Mr. Van Slack and three other prospectors from San Bernardino. The locators sold a claim to sink a shaft to bedrock. The prospects are decidedly flattering, as pay dirt was found at the outset. Summit is 65 miles from Mojave and about 30 miles from Red Rock.

While at the camp on Sunday, three boys drove from another location and exhibited some rich dirt but refused to give the location. In fact, the whole country is being prospected and more or less gold found.

Will Robinson, an experienced coast miner, is of the opinion that the value of the Goler and Red Rock districts is limited, while he expresses great confidence in the newly-discovered region where his claim is located. This diversity of opinion is only typical of the real miner and cannot be of great value to the prospector in times of mining excitement.

A San Jose prospecting party is now engaged in the old deserted El Paso district in trying to develop water. It is thought that good water can be secured. Lack of water is a drawback to the new Summit diggings. The gold found in these parts is very fine, unlike that taken from Goler and Red Rock. Several washes at Summit appeared to be very extensive.

A San Bernardino prospector claims that he has discovered auriferous rock in paying quantities in Mesquite canyon, seven miles from Kane Springs, on the road to Goler and beyond Red Rock. The quartz lead is of recent discovery. It is the first ledge to be found that presents bright prospects. Quartz mining has as yet been almost unheard of in these gold fields.

In the Goler district miners, who prefer it, are getting $2.50 a day and board. None but good miners are employed. Meals are 35 cents in this camp and other necessaries in proportion. The prospectors are all supplied with their own outfits, both as to provisions and bedding. The weather up there is cool. Feed for horses, such as grain, is scarce, while the burros do not suffer owing to their peculiar taste for vegetation that the horse cannot touch.

In going to Summit the prospectors secure water from the Mesquite springs, where the water is unusually good. Water can also be secured at the last station on the road to the borax works in Death valley.

The Red Rock district is about 27 miles from Mojave. The road is good the entire distance.

When the forks of the road are reached this eide of Red Rock the prospector going to Goler takes the road leading to the north. The other road leads into Red Rock canyon, where there is a mining camp of no mean dimensions, in fact, all the region is beginning to assume the characteristics of early mining daye, when gold was found easily and spent lavishly. Men and teams are constantly going in and out of ths new gold fields.

Nevada.

THE EVENINO STAR.—*Telegraph*: The Evening Star Mining Company is now engaged in paying their last installmsnt on the purchase price at the Citizens' Bank. It is understood that there will soon be some very active operations started. A new shaft will be sunk and the ledge will bs tapped at a place where a great deal of labor can be saved in the working of the mine. There will be eeveral changes in the huildings, and in fact the whole outfit will he rearranged.

FOR A NEW ROAD.—*Herald*: The people of Washington and vicinity want a road from Washington to the California mine, and with that end in view have raised some $1400 or $1500 by private subscription. The road will be about seven miles long, and will open up God's Country.

AT THE SEBASTOPOL.—*Union*, Dec. 19: A mine that will come to the front soon is the old Sebastopol, eituated on Oshorne Hill, worked by ths Watt Bros. in the early '50s, and which paid very well at that time. Considerable work is being done on the ground in the way of prospecting. The Sebastopol is situated in a good locality, being joined on the eouth by the Green mountain, on the southwest by the Osborne Hill, and on the north by the Orleans. These mines are all working and doing splendidly. In fact, all along the lode, from the old Empire to the Oshorne Hill, considerable work in the way of developing and repairing old mining propsrties is under way.

A STEIKE IN BELLEFONTAINE.—The Bellefontaine Company, at Willow valley, have struck what they believe to he the old Beach shoot, which paid so well in 1858, says the *Herald*. It is thought the rock will go as high as $75 psr ton, and there are 600 feet of backs. It is splendid looking ore, heavily sulphuretted, and free gold may be seen all tbrough it.

BAD BLASTINO ACCIDENT.—*Transcript*, Dec. 14: Two men arrived here from Washington last evening to go to the Eagle Bird mine to attend two men who had been blowu up by a blast. It seems that the night shift working in the upper tunnel has set off four or five blasts just hefore quitting work. One of the blasts failed to go. They notified the two msn on the day shift, Frank Means and Staples. These men drew the charge, and supposing everything was all right, began drilling the hole deepsr, when the explosion occurred. It is thought that a portion of nitro-glycsrin from the giant powder had lsaked out into the hole. Both men were terribly mangled about the face and head. Means had both eyes hlown out, his hands nearly torn off, and was badly hruised about tbe body. Staples' eyes were badly injured, and it is doubtful if he can escape without ths loss of his sight. He was terribly torn abont the hody. How elther escapsd instant death is a miracle. Both the injured men will probably live.

THE MANZANITA.—*Transcript*: The prospects of the Manzanita gravel mine are better now than thsy have heen for some time. In about two weeks we may expect to hear some good news from that quarter.

THE ONIN.—*Transcript*: The work at the Odin is progressing finely. They have some fine gravel now.

RICH LEDOR.—*Telegraph*, Dec. 15: The big formation which extends from the junction of the north and middle Yuba rivers to the south Yuba river at a point near Jones Bar, promises to be another Comstock, with gold in place of silver. It varies iu width from 40 to 100 feet and is composed of talc, porphyry and ochre, and pays its entire length, a distauce of five miles.

Tbe ore can be mined aud milled for 75 cents per tou. The lowest mill test yet made returne $3 per ton and the highest $18, with an average of ahout $10 per ton.

Upon the Boss location, which has beeu bonded by Messrs. Crall, Trood, Deneca and Godfrey of North Sau Juan, for a period of six months, for $8000, to Messrs. H. M. Morris, T. Dilion and T. C. Howell of San Francisco, a five-foot Huntiugton mill has been erected and a thorough test has been made, which is said (exact amount they will uot say) to have yielded $12 per ton.

A number of Sau Francisco capitalists are negotiatiug for the entire ledge. Locations are now held as high as $30,000, and it is quite likely that a number of big eales will soou be recorded. Excitement rune high.

The principal owners are: H. V. Crane and Frank Wright of San Juan, L. P. Schmidt and J. J. Ott of Nevada City, Sheriff Douglass and R. I. Thomas. The entire ledge is takeu.

It was about 12 yeare ago that this ledge was first known to contain gold. In 1881 a Forbes mill was erected and the owuers, who were inexperienced quartz miners, used hut eight square feet of plates with coarse screens. Under these conditions $3.50 per ton was saved; disagreement among the owners resulted and in consequence nothing has heen done toward practical development till the preseut time.

NEW HOISTING WORKS.—*Transcript*: William Veal and W. Mosby, who are workiug the Graut mine at Canada Hill, will shortly begin erecting uew hoisting works. Part of the lumber is on the ground. In the spring a mill will be put up. This mine is owned principally by Colorado parties.

BY THE "ELEVATOR" PROCESE. — *Herald*: Jerry Goodwiu is preparing to work his miue at You Bst by elevator process. He is now digging about a mile of ditch for that purpose, and will operate on a larger ecale wheu everything is iu readiness.

Plumas.

NEW GRAVEL MINE.—Plumas *National Bulletin*, Dec. 14: Messrs. Nevill, Rosi aud others have located a drift gravel mine at the hsad of Red Ravine, uear the headwaters of Nelsou creek. The locations cover 200 acres ou the line of the channel, which runs iuto Bluenose mountain. The company will begin development work next spring. The indications are that they have a fine property. In an adjoining drift and hydraulic mine, Mr. Bevalaqua and two other men are taking out from $6 to $7 per day to the man. The gold seems to exist in a deposit of blue gravel, very much resembling that found some years ago in the Buffington mine on the North Fork. The owners of the new location are confident that it is on the line of an extensive and rich channel.

B. A. Ivanisevich and esociates are running a tunnel into Bluenose mountaiu from east to west and expect to cross a channel running north and south. After driving their tunnel ahead from 300 to 400 feet, they will sink a shaft to the bottom and prospect the channel. If results prove satisfactory, a deeper tunnel will be run into the mountain. Six men are uow employed, working two shifts. When the work of sinking the shaft begins, three shifts of men will be employed.

Wm. Roche, L. Dolly and John Simpson have a very fine vein of quartz at the head of Squirrel creek. Its average width is 30 inches. The croppings prospect very rich. the result of about a dozen assays made in San Francisco and Oakland bsing $57 per ton. With a 500-foot tunnel, the vein can be tapped at a depth of 200 feet. Tbey are now pushing the tunnel ahead and expect to reach the ore body within 70 feet of the present face.

There seems to be grsater confidence in the future of the Plumas Eureka mine. Quite a development is understood to have besn made near the top of the peak and in an entirely new country. The extent of the new find ie not known.

Messrs. White, Smith and R. M. Dunn have a contract for running a tunnel in the Jamison mine, and tbey are making good progress. The hoisting works are equipped with machinery that works to perfection. It is driven by water power—one of the best in the county. Supt. Obeyney, lately on a visit to his old home in Philadelphia, returned last week, and after spending a few days at the mine, departed for Shasta to visit another important property which his company owns.

AT GIBSONVILLE.—Cor. *National Bulletin*, Dec. 11: The recent storms increased the supply of water to such an extent that the mines hereabout commenced operating.

The Schofield boys are busily engaged repairing their tunnel, prsparatory to taking out some good pay gravel.

The Nsvada mine had a few days water and were enabled to make a start for the season.

The rock in the Tabor mine is becoming softer each day. Three shifts are heing worked, and the entirs community is anxiously awaiting and hoping for a "rich strike."

The Thistle shaft continues to employ about the usual number of men.

San Bernardino.

THE GOLBE DISTRICT.—Los Angeles press dispatch, Dec. 15: Most favorable reports continue to come in hsre regarding the richness of the new mining district called Golee, about 25 miles northwest of Mojave. Frank Budd and W. Zimmerman, of Lancaster, returned today from the camp and at once went back after getting supplies. They are greatly elated over the prospect, and rsport great excitement iu that region and many men striking it rich. Mr. Budd says that big sacks of nuggets are common things thereabouts, and positively stated that a numbsr of miners in Red Rock canyon are takiug out $100 a day on an average, all hy dry washers. Tbe custom is to have a glass far at the side of the washer, aud after the cleanup the nuggets are placed in this, making a stirring sight. The gold ie of excellent grade and is sold at the camp to dealers at $18.50 per ounce. A little farther up the main road to Indepeudeuce a new and equally rich camp is drawing a multitude of prospectors. Mr. Budd states tbat G. W. Hamilton of Lancaster, with his partner, has a very rich claim, and are working iu dirt that pays from $1 to $1,25 per pan, although they were not yet down to bedrock. The news has occasioued great iuterest iu the new camp, and an exodus of mining men has already commenced.

GOOD STRIKE.—Vanderbilt *Shaft*, Dec. 15: A ledge that, at eight feet below the surface, shows well defined walls, a solid veiu five feet wide and one that avereges about $30 from one side to the other, in a camp where as yet no prospect has failed, is what the Gold Bar Mining Company can show iu its new find. It is showing up hetter than was expected, and work on it will be pushed.

Shasta.

FOR THE GLADSTONE.—*Democrat*, Dec. 13: Joe Porter of the Gladstone mine, who has been absent in Idaho for about a year, returned home Sunday. While in Idaho he was engaged in tearing down and putting up mining machinery, and shipped the 40-stamp mill to the Gladstone, a portion of which uow lies ou the platform at the depot. Ten of these stamps will be put up on the Gladstone, and ten will be put up iu Siskiyou county ou a mine the Gladstone Company owns there.

NEW CUSTOM MILL.—*Free Press*: E. Markwick, the mechanical engineer, is about to form a company to erect a custom quartz mill ou Clear creek which will he centrally located for Muletown mountain. Water rights and millsites have already been secured, and three miles of ditch to carry water for power. Thirty-five hundred dollars have already been invested in machinery. Mr. Markwick has prepared all the working plans and is uow confident they will be carried out. He says there is more free-gold quartz in that mountain than any other in Shasta county, and the time is near at hand when there will be 500 men at work in Muletowu mountain.

Siskiyou.

TO RESUME.—Ashland *Tidings*: The Siskiyou Coal Co. is preparing to resume operations at its mine near Montague. An engine has been purchased to operate the pumps and lifts, and a considerable quantity of coal will be taken out. The mine is within a mile of the S. P. R. R. track, and, if the coal ie of as good quality as reported and in quantity large enough to pay for mining, the property will be a valuable one. The vein averages about three feet, and the coal is said to be a far more economical fuel in furnace uss than that generally used on this coast. Roadmaster Buckhalter, Dave Horn, J. C. Coyle and others of Hornbrook are among the principal stockholders.

READY TO BEOIN.—Yreka *Journal*, Dec. 20: The Spangler Brothers are almost ready to commence work again in Humbug creek, above the mouth of the stream, where thsy left good paying gravel over a year ago. The hoisting machinery, pumps and other apparatus are all in place, and when work is started up will be continued right along, with prospects of realizing a fine yield of gold dust.

The Greenhorn blue gravel mine, about a mile south of Yrska, still continues to yield its usual average, but is worked short-handed just uow, owing to a numher of men being afflicted with la grippe.

The Summerville hydraulic claims, in the Salmon river section, are now being worked with energy, the water snpply being abundant to keep a full force employed. The ground in ths Summerville section always yields rich returns, and the company, consisting of Geo. Smith, Geo. C. Spooner, Parker Bros., R. H. Campbell and others, expects to take out considerable gold dust during tbe present winter and next spring until midsummer, or as long as the water holds out.

Quite a large number of miners have taken advantage of the amended relief section of the U. S. Statutes, granting temporary suspension of assessment work for 1893.

The mill at the Sbroeder quartz mine on Deadwood mountain is kept constantly in operation day and night, with a large force quarrying out the quartz. There is only about 16 incbes of snow at the mine, which does not interfsre with work on tbe ground surface to any extent of consequence.

Placer.

NEW MILL.—Colfax *Sentinel*: The new ten-stamp mill of the Gold Ring mine at Green valley will be ready for work about January 10th. Cement gravel taken out of the mine is full of gold. About 16 men are at work at present in making preparations.

About eight men are at work opening up the Golden Eagle mine at Shady Run. A new tunnel, lower than the old one, will be run in ordsr to secure more grade for working.

The Polar Star mine at Dutch Flat will begin operations in a few days, as soon as the works are all in order. This mine was once a famous gold producer by the hydraulic process.

Yuba.

THE BLUE GEAVEL MINE.—*Democrat:* Congressman Caminetti and State Debris Commissioner Kidder visited the Blue Gravel mine, of the Excelsior Company, at Smartsville Monday and inspected the impounding dam which they have constructed. The work has been done in accordance with plans furuished by tbs U. S. Commissioners and was inspected by them after completiou, wheu a permit was issued under which the mine is now being operated.

The dam and settling reservoir covers a large area of ground wbich was mined out by hydraulic process years ago, leaving high hanks on either eide, tbe front opening being filled, which forms a large, deep reservoir. The gentlemeu who have visited the works say it effectually restraius the debris and will coutiuue to do so until filled.

NEVADA.

Eureka District.

DIAMOND AND EXCELSIOE.—Eureka *Sentinel*: Last week the anuouncement was made that the Diamond and Excelsior Mining Companies had filed articles of incorporation in Utah, with their principal place of business at Salt Lake City, to operate two groups of mines and claims in this district. The Diamond Company was organized with Richard Mackintosh, R. C. Chambers, C. L. Rohertson, J. E. Dooley and Charlee Read as directors. The officers for the first term are: Richard Mackintosh, president; R. C. Chambers, vice-president, and C. L. Robertsou, secretary. The Excelsior Company was organized with the same gentleman as directors as those named in the Diamond Company, and with Charles Read, president; R. C. Chambers, vice-president, and O. L. Robertsou, eecretary.

The properties of the respective companies cousist of two groups of mines situated on the eastern elope of Prospect mountain and comprise some of the oldest locations in that part of the district. The plans of the companies are not vet fully matured, but we are apprissd of the following facts: The Excelsior mine will remain for the present comparatively inactive, and the Diamond mine will be worked with less thau one-half the force of meu that were employed iu it before silver dropped away down to the lower figures. It is the intention of the company to conduct their operations in the same conservative manner that governed the businese of the owners prior to their iucorporation. Owing to the unfavorable condition of the silver market the mine at present will not be worked for profit, but for development, and ore will be extracted only in such quantities as will substantially pay the running expenses of the company. A fine, new double-acting engine, with reels for flat wire ropes and capacity and equipments to sink to a depth of 1500 feet, was set up in the lower Diamond tunnel several weeks ago. The main shaft is now down 473 feet, and will be continued to a depth of 1000 feet, and levels will be opensd for the purpose of exploring the mine to that dspth for still more extsnsive opsrations and to be prepared for a better market for the product when the time comes. At a depth of 1000 feet the bottom of the shaft will be about 1700 feet below the surface workings and 500 feet deeper than any otber workings in Eureka district.

The yield of the Diamond mine for ths present year, notwithstanding that no ore was extracted during the months of July, August, Ssptember and October, and a part of November, will sggregate not much lees than 7000 tons, with an average gross value of about $30 per tou in gold, silver, lead and iron. The mine nsver looked as well as it does now.

Ferguson District.

MINE RESUMES. — Pioche *Record*, Dec. 7: Operations at the Magnolia are resumed and promise to be permanent. A small force only is now employed and ore is being shipped to the mill at Hiko, ten teams being engaged in the work since Saturday last. About 800 tons of ore are already out, which is expected to average $100 a ton in gold, and on this grade of material milling will be commenced. Seven men are employed about the mill, and it ie expecteu to be running in about ten days. The mill is in excellent condition considering the lsngth of time it has remained unnsed. As soon as milling begine about 15 men will be put on at the mine, and this force is expected to supply ore enough to keep the mill running steadily. The ore is brought down on the Golden, or north side of the gulch, and a grade is constrncted from the divide on tbe Helene road through Golden. The Ferguson brothers and Jerry Manning have ths work in hand.

White Horse District.

PEOMISINO PROSPECTS.—Tbe Jim Blaine location in Wbite Horse district, Washoe county bas been bonded for $12,000. The shaft is down 90 feet and tbe bottom is in high grade gold-bearing qoartz.

In tbe Royal claim ore assaying from $6 to $100 a ton has been developed.

From ths Emma L. claim samples of quartz are shown specked with coarse gold.

A controlling interest has been sold in ths Black Point, another promising location.

Ths Wadsworth *Dispatch* says that a prominsnt mining expert has offered to hond any one of a dozen locations in the district, hut as the owners have pay ore in sight they are not in the market.

OREGON.

TO TRY AOAIN.—Ashland *Tidings*, Dec. 15: Jas. E. Smith & Co. have concluded to build anotber wheel to run their mill hy the current in ths Klamath river. The unexpected rise in the river last month took out their wheel and they thought of putting in an engine, but finally decided to risk another wheel, which they will hnild so that it may hs lifted higher than the one that was lost. L. E. Payne went over to Anderson's Fsrry from Ashland on Wednesday to construct the wheel for them.

The Sborty, a short extension of tbe Hope mining claim, is now owned by Messrs. Alonzo Edwards, E. K. Anderson and Geo. C. Sanford. They are preparing to work the mine, and have men at work clearing out the old shafts and putting them in safe working condition.

At Cottage Grove, the other day, Dr. Hamsll, secretary of ths Annie Mining Company, said, as the road to Bohemia was impassabls during the winter ssason, the company had placed provisions and 20 good men at the miue for au all winter's run, and, as soon as they could get out in the spring, wonld have a large influx of hullion; also that there would be two uew mills placed in that district as soou as packers could get in.

RECEIVER FOE A MINE.—Jacksonville *Times*: T. J. Obapman of Gold Hill has takeu charge of the Hammersly mine, having been appointed receiver by the circuit court. A large quantity of quartz has been crushed by the small mill on the ground, and it is supposed that it paid well. It is likely that operations will he coutiuued.

The T. P. M. & M. Co. of Leland have five men at work ou their property laying pipe, digging ditches and getting ready to commence active operations at an early day. The water used to operate this mine will be forced by pump pressure to an elevation of 400 feet. Dan Greer, an experienced California miner, is superintendent.

RESUMED OPEEATIONS. — The Taylor Placer Mining and Milling Company of Chicago, says the Grant'e Pass *Observer*, has again resumed operations. Representatives of the company from Cbicago have beeu in the county for a few weeks fixing up its business, which had got into bad shape owing to bad manegement. They have paid off several thousand dollars of its obligations, and now, with a clear record to commence anew with, the work will be pushed to completion. Undoubtedly this company owne some of the richeet placers fouud in southern Oregon. Much of the ground ehows very rich, as high as 50 cents to the pan having heen washed out by prospectors, while it is eaid to he impossible to wash a pan without getting several particles of gold. The company have ou the ground a complete set of powerfol pumps, shipped from the East for the purpose of raising water onto their claim. The pumps will be run by steam power aud are being placed in positiou uow.

Market Reports.

The Markets.

SAN FRANCISCO, Dec. 21, 1893.

The course of the silver market during the week has shown little change. There has, however, been a slight advance both in London and New York. The situation with reference to Congressional legislation seems to be slightly better. Senator Voorhees has introduced his silver bill, which, though unsatisfactory both to silver and anti-silver men, seems to give indication that an effort will be made to enact some sort of legislation.

Copper.

James Lewis & Sons' (Liverpool) monthly report says:

A much more hopeful view as to the future value of copper now prevails. It is thought that as the excessive American export of 30,000 tons during the past four months has been so readily absorbed by European consumers and dealers, as soon as the supplies from thence materially fall off, which they will probably shortly do, in view of the great improvement in the home trade of the U. S., further European consumptive demand will considerably diminish the very moderate public stocks held in England and France. Several parcels of matte and cake copper have been repurchased by the original American sellers.

Lead.

The lead market is suffering from great depression in view of the probable reduction of the duty. One week ago the price was down to $3.10 per hundred. It has since then slightly advanced.

Silver and the Metals.

NEW YORK, Dec. 21.—Following are the closing prices for the week:

	Silver in London.	Silver in N. Y.	Copper.	Lead.	Tin.
Thursday	32	69½	10 00	3 10	20 40
Friday	32	69½	10 10	3 10	20 40
Saturday	....	....	....	....	.....
Monday	32¼	69½	10 50	3 20	20 30
Tuesday	32¼	70	10 37½	3 10	20 40
Wednesday	32	70	10 30	3 20	20 65

San Francisco Metal and Coal Market.

ANTIMONY.		**QUICKSILVER.**	
Per lb	— @ 13	Home trade, pr. flask	40 50 @41 00
BORAX.		**STEEL.**	
Refined, tn car lots	— @ 7½		
Powdered, do	— @ 7½	English, lb	— @ 20
Concentrat'd, do	— @ 7½	Canton tool	— @ 8½
All grades jobbing at advance.		Bl'k Diam'd tool	8½@ 15
COPPER.		Pick & Hammer	9½@ 10
Bolts	23 @ —	Machinery	4 @ 5
Sheathing	23 @ —	Toe Calk	— @ 4½
Ingot, jobbing	— @ 20	**PIG TIN.**	
Do, wholesale	15 @ 16	Spot, lb	21½@ 22
IRON.		**COAL.**	
Bar, base	— @ 2½	SPOT FROM YARD—PER TON.	
Norway, base	— @ 4½	Wellington	$8 00
PIG IRON.	Spot.	Greta	7 50
		Nanaimo	6 50
Eglinton, ton	18 00@—	Gilman	6 00
Glengarnock	18 50@—	Seattle	6 50
Am. Soft, No. 1	—@—	Coos Bay	5 50
Shotts No 1	19 50@—	Cannel	9 00
Puget Sound	—@—	Egg, hard	12 00
Clay Lane White	19 00@—	Wallsend	7 25
Langloan	22 50@—	Scotch Splint	8 00
Gartsherrie	22 50@—	Brymbo	7 50
Barrow	22 50@—	West Hartley	7 50
Cargo6eet	—@—	TO LOAD—PER TON.	
LEAD.		Australian	6 50@—
Pig	— @ 4½	Liverpool Steam	6 87@—
Bar	— @ 5	Scotch Splint	7 00@—
Sheet	— @ 6	Cardiff	7 00@—
Pipe	— @ 5½	Lehigh Lump	10 00@—
SHOT.		Cumberland	8 50@—
Drop, sizes *smaller* than B, bag of 25 lbs	$1 75	Egg, hard	9 00@—
Do do, B and *larger* sizes bag of 25 lbs	2 00	West Hartley	7 50@—
Buck, Balls and Chilled do, bag of 25 lbs	2 00	**COKE.**	
		English, to load	$9 50@10 00
		Do, spot, in bulk	—@12 00
		Do, in sacks	—@14 00
		Cumberland	9 50@—

Mining Share Market.

SAN FRANCISCO, Dec. 21, 1893.

The Comstock market has been uneven during the week just passed, but has, on the whole, suffered a decline. The trend during last week was wholly downward. At times there were small rallies in certain stocks, but the buyers of one day would become sellers the next day, and there was no stability in the situation, so far as sustaining influences were concerned. Friday afternoon the leading stocks closed at a sharp little advance, but Saturday morning they went down just as sharply.

The market opened at a sharp decline in the Pacific Board-room Monday morning; went still lower at the first session of the San Francisco Board; had a further decline during the subsequent informal session, and closed weak. Business was active among the brokers owing to the increased sales.

Tuesday was the most active morning the mining stock brokers had for over a week. The transactions in Comstock shares were large at all the sessions of the Boards, and the amount of money gained through the commissions was correspondingly great. The market opened at lower prices and continued weak up to the closing. Wednesday there was a reaction, during which many shorts were filled, and purchases were made for account of dealers who thought there was "a turn in 'em." Through such influences the market for a time advanced. Business was also quite lively at the opening. Soon afterward a selling movement began which continued until noon, and prices declined until the leading stocks fell below the lowest points of Tuesday.

Board Sales of Mining Stocks.

S. F. Stock Board.

TAURSDAY, December 21, 1893.

9:30 A. M. SESSION.

200 Andes	45c	50 Mexican	70c
650 Belcher	90c	200 Ophir	1.25
300 Bodie	20c	50	1.20
50 B & R	1.70	100 Potosi	65c
200 Challar	40c	100 Union	70c
50 Con. Cal. & Va	2.80	250 Yellow Jacket	95c
300 L Wash	5c		

2:30 P. M. SESSION.

300 Andes	40c	100	2.75
300 Belcher	90c	100 G & C	65c
800 Best & Belcher	1.70	100 H & N	55c
100 Bodie	20c	100	60c
200 Challenge	35c	100 Overman	30c
100	40c	100 Savage	35c
100 Challar	35c	100 Sierra Nevada	95c
300 Con. Cal. & Va	2.70	100 Yellow Jacket	90c

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING DECEMBER 5, 1893.

510,227—BICYCLE—A. Murray, Angel Island, Cal.
510,152—SHAVING BRUSH—G. L. Belcher, Oakland, Cal.
510,317—BRACKET—C. M. Berry, S. F.
510,319—COMPUTING SCALE—Blair & Griffin, Sacramento, Cal.
509,870—NUT LOCK—J. C. Brown, Santa Barbara, Cal.
509,937—TIDE POWER—G. H. Carlson, Hogmom, Wash.
510,250—EASEL—C. E. Fount-in, Port Townsend, Wash.
510,251—SMELTING FURNACE—J. L. Giroux, Jerome, A. T.
510,250—PAVEMENT—W. F. Higgins, Portland, Or.
510,140—GAS ENGINE—G. E. Hoyt, S. F.
509,912—AMALGAMATING SLUICE—J. H. Jory, S. F.
510,143—HARROW—Kelsey, Wallace & Thompson, Lebanon, Or.
510,268—RAILWAY RAIL JOINT—L. W. Kennedy, Oakland, Cal.
509,922—SASH FASTENER—D. C. Livermore, Los Gatos, Cal.
509,925—TIRE PROTECTOR—M. H. Lothrop, Jacinto, Cal.
509,926—FAN FOR ROCKING CHAIRS—J. H. Macartney, S. F.
510,355—BAGGAGE CARRIAGE—F. P. Monn, S. F.
510,079—FUMIGATOR—J. M. Miller, Riverside, Cal.
510,357—HAY KNIFE—A. Moeier, John Day, Or.
510,360—CAR COUPLING—W. C. Nelson, Santa Rosa, Cal.
510,048—ELECTRIC APPARATUS—O. H. Pieper, Santa Rosa, Cal.
510,290—BOOMERANG—C. W. Reneor, Stockton, Cal.
510,200—CAR BRAKE—H. J. Small, Sacramento, Cal.
509,961—TICKET—C. S Smith, Spokane, Wash.
510,055—FRUIT PICKER—Stodder & Eastman, S. F.
510,216—PICTURE BLOCK—C. Walbel, S. F.
510,056—WAGON REACH COUPLING—E. S. Weddle, Traver, Cal.
509,990—FRUIT CLIPPER—F. E. Wood, Pomona, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

AUTOMATIC SAFETY GUARD FOR CARS.—Ira P. Clarke of Alameda, assignor of one-third to John H. Knstar of Oakland, Cal. No. 510,675. Dated Dec. 12, 1893. The nbject of this guard is to automatically pick up the obstructing body and depnsit it upnn itself, holding it there safely and with as little injury as possible, said guard conforming to all the requirements of travel. The guard consists of a frame or receptacle of a general C shape, suspended from the truck and movable backward by yielding at its upper end, its lower edge forwardly projecting over the rnad hed, and a backwardly yielding flap suspended from ahnve and in front of the upper portion of the main frame or receptacle.

CASH REGISTER AND INDICATOR.—Edward T. Taylor, Oakland, Cal. No. 510,622. Dated Dec. 12, 1893. This invention relates to a register by which the amnunt nf cash received is indicated, and by which the cnnsecutive amounts are added up so that the total may be observed at any time. It consists essentially nf cylinders jnurnaled within an enclnsing casing, having figures arranged spirally around the peripheries, one cylinder showing cents and the other indicating dnllars. Alnng the frnnt nf the machine are indicating buttons or keys having marked upon them figures rspresenting these subdivisinns, which are indicated upon each of the cylinders. These indicating keys are so connected with a pawl and ratchet mechanism that when either of the levers are depressed the ratchet wheel will be turned and with it the corresponding drum. Upon the back of the apparatus is an upwardly projecting portion nf the case having openings alnng the front and back, and within these openings are pivoted plates which carry figures correspnnding with those indicated upon the cylinders and with those marked upon the keys, and which are moved in unison with the keys. The cash drawer, which is situated in the front of the lower part of the register, is stationary, and opened nr closed by means of a rotating shell which surrounds it and which is slotted upon one side.

AIR BRAKE.—Joseph Erdody, San Francisco, Cal., assignor of one-half to John H. Cardoza. No. 510,594. This invention relates to improvements in air-brake mechanism. It consists of a supplemental air reservoir, a brake cylinder having one end in open connection with the reservoir, a pipe supplying air from the main reservoir to the opposite end of the brake cylinder, a piston movable in the cylinder, a valve chamber in the piston and a valve through which air is admitted from the supply pipe to the supplemental reservoir, and means for normally holding the piston at the end of the cylinder adjacent to the reservoir until the pressure in the reservoir is greater than the combined pressure of the spring and the air upon the opposite side of the piston, and pipes and valves whereby the pressure of the air is varied so as to actuate the piston and apply the brake or to relieve the brake by moving the piston in the opposite direction.

TURN-TABLE.—M. A. Edwards, administratrix of E. W. Edwards, San Francisco, Cal. No. 510,592. This invention relates to turn-tables which are specially applicable for use on cable roads. It consists of a mechanism whereby the endless traveling cable which propels the cars may be thrown into contact with a drum fixed upon a shaft carrying a gear-wheel, and through intermediate gearing this gear acts to rotate the table as long as the cable is in contact with its driving pulley. A lever mechanism is so arranged that the cable is thrown into or out of contact with this pulley at the will of the operator, and when a car has been received upon the table, the table may be turned around until it is in position to allow the car to again pass out.

SIGNAL FOR CABLE ROADS.—M. A. Edwards, administratrix of E. W. Edwards, San Francisco, Cal. This invention relates to a signal to be used upon railways. It is especially applicable for use upon railways at the point where the cars arriving upon one track are delivered upon a turn-table having a single track across it upon which the car rests until the table has been turned around, after which the car passes out upon another track parallel to the one by which it entered. The signal is a vertical rotatable shaft carrying targets for day signals and colored lanterns for night signals. An arrangement of levers, cords and pulleys is so stationed that when a car passes in upon the table, it will actuate one of the levers so as to turn the signal and indicate to the next approaching car that the way is not clear. When a car passes out and leaves the table it strikes a corresponding lever upon the other track and again turns the signal into position to show the approaching car that the table is in readiness to receive it.

ENDLESS SELF-LAYING TRACK FOR VEHICLES.—A. P. Anderson, Oriental, Nev. No. 510,668. This inventinn is designed to provide a continuous track for soft or sandy soil upon which vehicles may travel. It consists of a series of track plates of sufficient width and length so that each will form a suitable bearing surface for the wheel when beneath it. These plates have inwardly projecting flanges correspnnding with channels made in the peripheries of the wheels and so tapered as to conform to said periphery. These flanges serve to maintain an endless belt and plates in proper position with relatinn to the wheels of the vehicle. The plates are hinged together or attached to a continuous belt, and have shoes of suitable size and material to form ground bearings, being shod with iron or broad-headed steel nails to prevent wear upon rough ground. The vehicle may be a traction engine and constructed in any suitable or desired way. I employ a jointed frame, one portinn of which supports the engine and the other carries the steering apparatus. In this case, there are three pairs of wheels. The rear or engine wheel is connected with the central axle by a king bolt which allows of movement at this pnint, and the frnnt wheel axle is cnnnected with the front frame of a king bolt, so that the front wheels may be turned to steer the machine by means of a suitable hand wheel upon a vertical pinion shaft, and a curved rack connected with the front axle, with which the pininn engages so as to turn it. As fast as the vehicle passes over a length of the track it is taken up behind the rearmost wheel and carried forward over the front wheels and again placed upon the ground so that the wheels are cnnstantly traveling over it.

REVERBERATORY SMELTING AND REFINING FURNACE—Joseph L. Giroux, Jerome, Arizona. No. 510,251. This invention relates to hnrizontal furnaces of the reverheratory type. It consists in making the furnace in sections which are continuations hnrizontally in line with the fire-box. The latter is made of brick, having the usual grates, a bridge wall over which the heat and flame pass into the first section of the furnace, and another section situated just behind and across the bridge wall which forms a part thereof. These sections are all made of hnllow metal having an outside of boiler iron and the inside of heavy copper plate. The jackets thus formed contain water, which is admitted through a suitable opening into the first section, discharging thence into the next, and so on, in a manner to keep up a constant circulation and prevent undue heating of furnace walls. The furnace tapers or cnnverges toward the end most distant from the fire-place and has an end dnor which is adapted tn he opened at any time for the purpnse of skimming of the slag. Tuyeres open into the furnace at any suitable or desired points to admit an air blast, and these tuyeres cnnnect with wind-boxes which extend along upon each side of the furnace. Openings are made through the outer sides of the wind-boxes in line with the tuyeres to allow metal rods to he introduced to clear the inner end and prevent the tuyeres from being stopped with metal or slag.

PAVEMENT.—W. F. Higgins, Portland, Or. No. 510,259. This invention relates to pavements, and consists in the combination of interlocking prismoidal blocks in conjunction with a concrete supporting foundation and boundary curbs of the roadway and a grating of cement, asphaltum or other suitable material, whereby the blocks are firmly interlocked and are interdependent upon each other for support, thus relieving the foundation of the street from the pressure of any one block independently. As every block is supported in one direction between two others which have diverging bases while in a direction at right angles with these, it, in turn, serves to support the abutting ends of two other blocks which fit against it. This construction leaves spaces between the blncks and also spaces between those at the sides of the curbing, which is filled with the material before described for binding the blocks together. The whole surface may then be coated with asphaltum or any suitable or desired material.

DIVIDEND NOTICE.

San Francisco Savings Union.

326 California Street, Corner Sansome. Branch, 1700 Market Street, Corner Polk.

For the half year ending with the 31st of December, 1893, a dividend has been declared, at the rate of five (5) per cent per annum on Term Deposits, and four and one-sixth (4 1-6) per cent per annum on Ordinary Deposits, free of taxes, payable on and after Tuesday, the 2d of January, 1894.

LOVELL WHITE, Cashier.

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ASSESSMENTS.

COMPANY AND LOCATION.	No.	AMT.	LEVIED.	DELINQ'T AND SALE.	SECRETARY.
Alta S M Co, Nevada	44	10c	Nov 10, Jan 4, Jan 28		J E Jacobus, 309 Montgomery
Belcher S M Co, Nevada	47	20c	Nov 3, Dec 7, Dec 28		C L Perkins, Mills Building
Challar M Co, Nevada	37	10c	Dec 11, Jan 15, Feb 6		Chas E Elliot, 309 Montgomery
Gene Wyoming G M Co, California	3	5c	Oct 3, Jan 12, Feb 1		W J Gurnett, 308 Ploe
Crown Point G & S M Co, Nevada	63	20c	Dec 12, Jan 16, Feb 6		Jas Newlands, Mills Building
Inyo Marble Co, California	22	15c	Nov 10, Dec 14, Jan 18		W W Sargeant, Mills Building
Jack Rabbit M & M Co, Cal	5	3c	Nov 1, Dec 26, Jan 11		Chas Wetzel, 320 Sansome
Kentuck Con M Co, Nevada	8	10c	Dec 20, Jan 24, Feb 15		Aug Waterman, Nevada Block
La Grange Ditch & Hy M Co, Cal	9	25c	Nov 10, Dec 18, Jan 8		A Halsey, 328 Montgomery
North Gould & Curry G & S M Co, Nevada	15	10c	Dec 11, Jan 12, Jan 29		C H Mason, 324½ Montgomery
Mexican G & S M Co, Nevada	49	25c	Dec 16, Jan 19, Feb 13		Chas E Elliot, Nevada Block
Overman S M Co, Nevada	69	10c	Nov 10, Dec 14, Jan 4		Geo D Edwards, 414 California
Potosi M Co, Nevada	40	25c	Nov 13, Dec 16, Jan 4		Chas E Elliot, 309 Montgomery
Savage M Co, Nevada	82	25c	Dec 2, Jan 4, Jan 24		E B Holmes, Nevada Block
Teresa Mining Co, Mexico	12	10c	Oct 27, Dec 7, Dec 23		K J Wllats, Flood B'ld'g
Yellow Jacket S M Co, Nev	56	25c	Nov 16, Dec 21, Jan 27		W H Blauvelt, Mills Bldg

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE
Peer Mining Co, Nevada	Annual	Aug Waterman, Nevada Block	Dec 28
Peerless Mining Co, Nevada	Annual	Aug Waterman, Nevada Block	Dec 28
Weldon Mining Co, Nevada	Annual	Aug Waterman, Nevada Block	Dec 28

Cal. Debris Commission Notices.

THE CALIFORNIA DEBRIS COMMISSION having received petitions to mine, by the hydraulic process, from W. R. Stewart, in the Badger mine near Ono, Shasta Co., and to deposit tailings on adjacent flats; from Olonzo Engle, in the Walker mine, near Igo, Shasta Co., to deposit tailings behind dam in Pomeroy Gulch; from McKinstry & Gilbert, in the Christmas Hill Secon diggings, near Butcher Ranch, Placer Co., to deposit tailings on the banks of a fork of the American river; from W. R. Read, in the Tannery Ravine mine, near Challenge Mills, Yuba Co., to deposit tailings behind dams in Tannery Ravine; from Manuel Mateos, in the Mateos mine, near Sierra City, to deposit tailings in Howard creek; from Jos. Davis, in the Davis mine, near Sierra City, to deposit tailings in Howard creek; from Frank Barbero, in the First Chance mine, near Sierra City, to deposit tailings behind dams in Howard creek; from Philip McGuire, in the North Star mine, near Mokelumne Hill, Calaveras Co., to deposit tailings behind dams in Buckeye Gulch, and from J. W. Smith, in the Green Mountain mine, near Mokelumne Hill, to deposit tailings behind dams in Chile Gulch, and from the 54 Flat Placer Mining Co., in the 54 Flat mine, near Volcano, Amador Co., Cal., to deposit tailings behind dams in a dry ravine—gives notice that a meeting will be held at Room 92, Flood Building, San Francisco, on January 2, 1894, at 1:30 P. M.

Assessment Notices.

STANDARD GOLD AND SILVER MINING COMpany. Location of principal place of business, San Francisco, Cal. Location of works, Butte County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 18th day of December, 1893, an assessment, No. 1, of five cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the Company, Room 4, No. 330 Pine Street, San Francisco, Cal., or to the President, Tyler Beach, St. James Hotel, San Jose, Cal. Any stock upon which the assessment shall remain unpaid on the 26th day of January, 1894, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on SATURDAY, the 17th day of February, 1894, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors. T. E. JEWELL, Secretary.

Office—Room 4, 330 Pine Street, San Francisco, Cal.

DELINQUENT SALE NOTICE.

CO-OPERATIVE PRINTING CO., 408 Sacramento St., S. F., Cal.

NOTICE.—There is delinquent upon the following described stock, on account of assessments levied on the 22d day of November, 1893, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
H. P. Brown	2	330	$660 00
Morgan Backus	3	330	660 00
Geo. W. Craddock	6	50	100 00
C. L. Walcott	8	280	560 00
T. P. Robinson (not issued)	9	330	660 00

And in accordance with law and an order of the Board of Directors made on the 22d day of November, 1893, so many shares of each parcel of such stock as may be necessary, will be sold, at the office of the Company, 408 Sacramento St., S. F., Cal., on the 8th day of January, 1894, at 12 o'clock noon of such day, to pay delinquent assessments thereon, together with the costs of advertising and expenses of the sale.

MORGAN BACKUS, Secretary.

408 Sacramento St., S. F., Cal.

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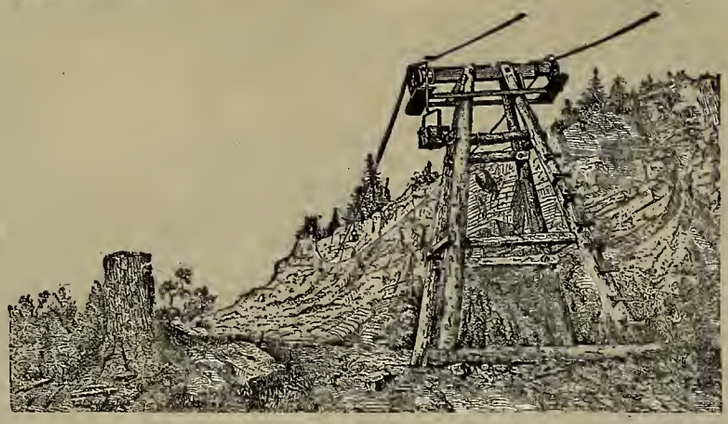

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VOLUME LXVII. Number 27. SAN FRANCISCO, SATURDAY, DECEMBER 30, 1893. Three Dollars per Annum. Single Copies, 10 Cents.

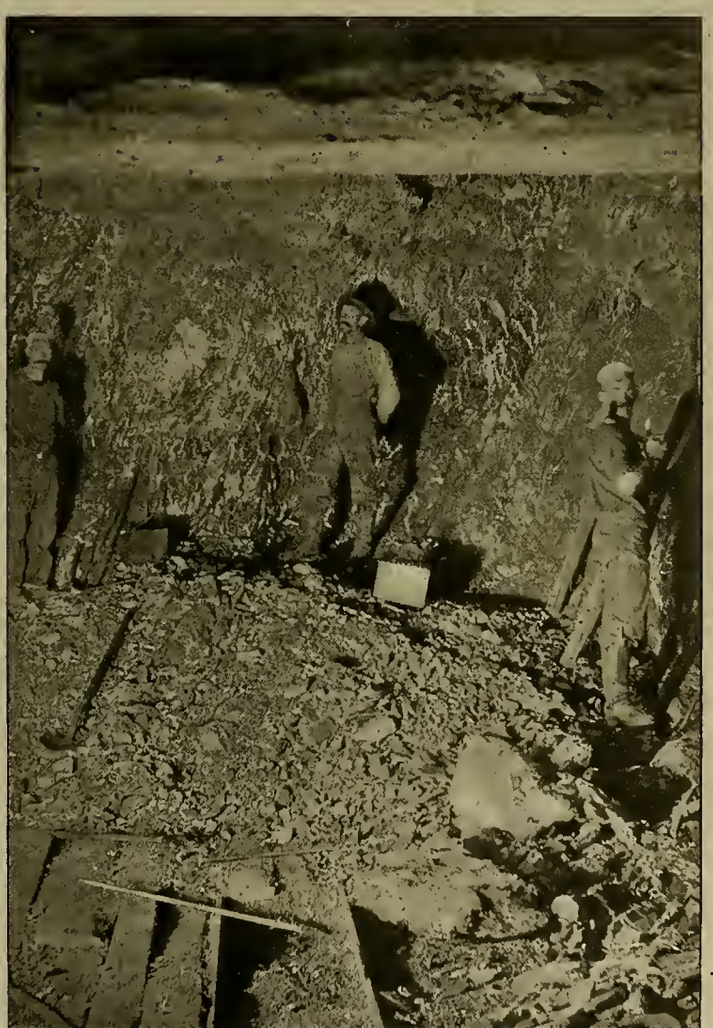
The Duty on Lead.

The address of several leading lead and mining companies to the miners of the United States, published in the MINING AND SCIENTIFIC PRESS, December 23, states succinctly the probable effect of a reduction of lead duties by the proposed new tariff law. The mining interest is practically a unit in opposition to the measure, being fully convinced that it contains a grave menace to the life of the industry. Without doubt the clause will be bitterly fought in Congress, but with what success of course remains to be seen.

The favorite argument of advocates of a low tariff is that the smelters are obliged to import a large amount of Mexican and British Columbia ores for a flux. But let us see into what consequences, in the judgment of many, the American industry will be involved if the gates are thrown open to all the world, and Spanish and all foreign ores are allowed to be brought in under a nominal duty. The price of lead in America depends upon the price in London, and is theoretically the same plus the ocean freight and the tariff. Actually, the New York price is less, being forced down to bedrock in the United States by competition between American companies. To illustrate: The quotation in London December 1st for soft Spanish lead was a trifle over 2 cents per pound (£9 10s per ton, to be exact). In New York the same day the quotation was 3.3 cents, a difference of 1.3 cents. If the duty on metallic lead is reduced to one cent per pound it is safe to say that the same Spanish lead will be laid down in New York for substantially the same price as in London, plus the one cent duty. It is claimed that ships will carry lead in ballast from Spain to New York for $1 per ton. The highest quotation for Spanish lead in New York would then be three cents per pound, and the probability is that it would be lower. There is only one way in which American mines can enter into competition, under these conditions, with the Spanish product, at New York, and that is by reduction of wages, smelting charges, and railroad freights both to the smelter and to New York. There are good reasons why the first named should not be done. There is no prospect that the second can be done, for the reason that the smelters are running now on a small margin of profit; and there is little hope of the third. There seems to be no alternative for many mines which are operating but to shut down, and for many which are idle to stay idle.

During the past few years several large smelters have been established in Mexico—started, many claim, because of the American lead tariff and the necessity in Mexico of economical reduction at home. However that may be, these smelters are in operation and they will be fostered by the Mexican Government; so that it is among things possible that an export duty will be placed on lead ore (if the Wilson bill goes into effect), that the product of the mines may be retained for the Mexican smelters. The purpose of the American tariff measure, so far as Mexico is concerned, would thus be defeated, and one foreign competitor for this market would be taken out of the way of Spain.

AT the recent annual meeting of the Geographical Society of California Fred W. d'Evelyn, first vice-president, read the report for the past year. He said the number of members is growing satisfactorily, and there are now 438 names on the roll, of which five are honorary, thirty life, and 403 contributing members. The position of secretary, vacated by the resignation of J. Studdy Leigh last July, has since been filled by Peter McEwen. During the year several valuable works were added to the library, which now has 1000 volumes. The society has also a valuable collection of lantern slides, most of them having been made for the purpose of illustrating comparatively unknown types of tribes and races in Africa, Sumatra, Borneo and other distant countries. These slides will be found particularly useful for illustrating ethnological lectures, and will add very considerably to the educational features of the organization. Exchanges are made with scientific institutions in almost every civilized country of the globe. Directors for the ensuing year were elected as follows: A. L. Bancroft; George W. Davis, M. D.; F. W. d'Evelyn; Edwin Fretwell, Dorville Libby; Rev. Frederic Masters, D. D.; Dr. G. A. Moore, Cyril W. Newall, Hon. W. H. Pratt, Frank Shay, S. H. Strite.



CAUNTER VEIN IN MAYFLOWER MINE.—*See page 419.*

THE proposition to place coal on the free list is generally regarded with favor by California manufacturers, for the very important reason that it means cheaper fuel, with all its attendant benefits. But, in the State of Washington, it is looked upon quite differently. The largest market for British Columbia and Washington coals is San Francisco. Is is well known that the foreign coal is superior to the Washington product; but its advantage does not end there. Many Chinese and Japanese are employed in the former, cheapening the cost of production. The veins are nearly horizontal, while the Washington pitch at angles from 45 to 60, making mining naturally more expensive. The British mines are nearer tide water, making transportation cheaper. All in all, the advantage is estimated to be about $1.50 per ton in favor of the outside article, in which the 75 cent duty only partly offsets. The Southern Pacific Railroad owns the Carbon Hill mine in Washington, and the Como on Vancouver Island. If the duty is removed, it is believed that it will shut down the latter, and operate the former only. All of which goes to show that protection of coal is strictly a local question, so far as it concerns Pacific Coast states.

THE hard times have driven the principal Colorado smelters into a pool, whose purpose has not been publicly announced, but which is understood to have ultimately in view divisions of territory as well as uniform smelting charges. It is said also that, taking the hint from methods in vogue among the railroad companies, it is proposed to plan a higher charge in all of the paying properties so as to equalize higher losses on others. It is the opinion of smelting men that the charge for crude ores should be $14 per ton. The charge for siliceous ores is now $13, having been recently advanced from $12. The companies represented at the conference were the Omaha and Grant, the Globe, Philadelphia, Pueblo and Colorado.

A RECEPTION of unusual interest took place at the Mechanics' Pavilion last Friday night, December 22d. It was tendered by the Mechanics' Institute to the workingmen who were engaged in the construction of the warship Olympia. The attendance was very large. A. S. Hallidie made a happy welcoming speech, and, in the course of the evening, addresses were made by A. W. Stahl, naval constructor, and G. W. Dickie, general manager, of the Union Iron Works, and Major C. A. Woodruff of the United States Army. He denominated the Union Iron Works as "America's greatest ship-building institution." The whole affair was a worthy tribute to the intelligence of the men who were actively engaged in the construction of the vessel.

THE executive committee of the Sacramento River Convention has chosen the following delegates to represent the convention at Washington in the efforts to secure Government aid for the improvement of the Sacramento and San Joaquin rivers: J. M. Gleaves, Redding; George Obleyer, Sutter; William Johnston, Sacramento; S. D. Woods, San Joaquin; Ed McGettigan, Vallejo; Mr. Edwards, Petaluma. Commissioners of the river counties will be asked to contribute $300 each, for expenses.

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THE International Exhibit of Mining and Metallurgical Machinery, announced to take place in Santiago, Chili, in April 1894, has been postponed until September. The object of the Chilian Government is to introduce the most modern and best mining machinery and appliances which scientific discovery and invention have developed as practical factors in her great mining industry, which represents $60,000,000 of annual exports of ores, minerals and metals. The liberality of the Cbilian Government toward exhibitors will remove all reasonable objections on the part of our machinery manufacturers, so far as they are based upon the distance to Chili; while the annual importation of machinery into Chili, aggregating $8,000,000 a year, would seem to offer for their consideration a valuable foreign market for their machinery.

GOVERNOR WAITE has issued the long-talked-of call for a special session of the Legislature of Colorado, to meet January 10th. The call consists of about 5000 words, and mentions over 30 subjects on which legislative action should be taken. The first business for the Legislature suggested in the call is to provide that all silver dollars, domestic and foreign, containing not less than 351¼ grains of fine silver, shall be legal tender for all debts collectible in Colorado. So much opposition has arisen to the extra session in Colorado that it is seriously doubted if it will accomplish anything.

SUPERINTENDENT DAGGETT of the Mint has announced a batch of new appointments. They are as follows: Abraham Norton, Los Angeles, Assayer's computing clerk; Henry B. Renn, Siskiyou, foreman annealing room; Samuel Ward, Tehama county, workman; James H. McGinnis, San Francisco, workman; Frank M. Luttrell, helper; A. W. Mariscb, San Francisco, blacksmith; Frank C. Eichelroth, Tuolumne, workman; William P. Cahill, watchman; Andrew J. Moulder, San Francisco, clerk. The appointments are to take effect Jannary 1st.

THE Hartford Consolidated Mining Company, with offices at 1012 Fourth street, Sacramento, has issued a very attractive prospectus. The company has purchased and will develop the Hartford, Red Deer, Cnrtis, Brown, Ida, Sacramento, Gold Crown, Red Cloud, Golden Gate and Cupper King mining claims, in Shasta county. The owners were M. J. Curtis and A. D. Bowley.

THE gold crushings at Witwatersrandt for month of October, were 138,599 ozs. This is 2,530 ozs. in excess of the output in August last, the previous largest.

SECRETARY CARLISLE does not recommend the coinage of the seigniorage of silver in the Treasury, although he has put the mints in readiness for it.

THE American Bimetallic League proposes to open headquarters in Chicago, with Editor W. H. Harvey, of *Coin*, in charge.

Low-Grade Ores Pay.

It is claimed that the Empire mine, in Montana, produces $3 ore at a profit; and the Penobscot, which was once shut down because $25 ore could not be handled, now works $5 ore successfully. These things illustrate very forcibly the improvement in modern mining and milling machinery. There are many mines on this coast which were once unprofitable because of expensive mining or milling—particularly the latter—but which may now be regarded as certain to yield remuneratively if judicious methods are applied to their re-development. Cases are now exceptional where the ore may not be reduced with very small loss. Between the various efficient types of milling machinery and the process of sulphuret treatment, ore that is very low grade and of steady quality may now be regarded as certain to pay well. It is not possible, for many reasons, to fix an invariable figure representing the minimum of profitable low-grade ore. Conditions vary at different mines and mills; but there are many of these conditions which can be determined with reasonable precision before a stamp is dropped.

Under average conditions, from $3.50 to $4 represents the minimum figure in California quartz mines. There are numerous separate instances where this record has been beaten. They are useful as examples of the application of high skill in conduct of mine and mill, as well as judicious business administration; but they are not criterions. They show what may be done under favoring circumstances, and, in many instances, they likewise show how adverse circumstances may be overcome. The Alaska-Treadwell is the best instance of a gold mine operated on a large scale yielding profitable returns on low-grade ore; and the Spanish mine, in California, on a small scale.

Comparatively speaking, gold-mining is now a low-grade proposition. Instances where a mine produces steadily $30 to $50 per ton, as in early days are rare; and one may fairly think he has a bonanza if he strikes a $10 proposition, with available water power or fuel, accessible supplies, and other conditions which are indispensable to the economical development of a claim. Other things being favorable, $10 ore means $5 profit, and if the ore deposits are sufficiently extensive, $5 profit means a fortune. From $10 to $12 is the average of ore worked in California. It is difficult to estimate what is the average cost of mining and milling; but, including business administration, interest on investment, and all charges that properly enter into expense and are in any way connected with mining operations, probably the average is not above $8. Where a mine has its own mill and chlorination or similar works (where needed), the cost should be less. The cost of mining and milling in the Nevada City district is, on an average, less than $5 in the principal mines. The ore carries a very high percentage of sulphurets, which have perhaps 15 ounces of silver to the ton. It is estimated that the silver alone pays the expense of chlorination. The concentrates are worth perhaps $200 per ton.

There are many idle mines in California which ought to be producers, and which, if operated prudently, could be. It cannot be disguised that in recent years an undue share of sloth and neglect characterized the operations of quartz mines in the State. In the past two years, the aspect of things has been materially changed, and a great deal of attention has been paid to gold properties. The result is that many prospects have been turned into mines, many idle mines re-opened, much done toward giving new life and health to the industry. New confidence has been inspired in the permanent valne of California mines. Gold-mining is now a science. It was, in its early days, pnre speculation. Study and experience have added vastly to the fund of geological and mineralogical knowledge possessed by Californians; inventive genins and experience have rendered the mechanical reduction of ores a comparatively perfect process; and what mechanics lack, chemistry has largely supplied. All this knowledge is put to its highest and best use in California; but it ought to be much more widely applied. It is not possible for every one to strike a Utica, or a Brown Bear, or a Kennedy, or a North Star; but it is possible to get hold of mines that will pay good returns on a reasonable investment. Gold-mining in California has a glorious past; but it has in store an even more splendid future—a future wherein pluck, technical skill and good common sense learned from experience, will achieve all that was in the past due to pluck, imperfect appliances, and, in some degree, at least, to luck.

WHEN lead recently reached 3.0 cents per pound in New York, it broke all previous records by .2 of a cent. The lowest previous figure was 3.31, in June, 1878.

IN the January *Overland*, Mr. A. S. Hallidie pays a fine tribute to the worth an character of the late William Tell Coleman.

Drift Mining on McRea Ridge.

Drift mining in California is a growing industry. It received a very great stimnlus when hydraulic mining ceased, and there has at no time been diminution of activity. Drift mining, properly conducted, is, as a rule, very remunerative. In early days, large fortunes were sunk in search for gravel channels—often nnavailing—but better luck has attended recent efforts, for the simple reason that better methods have been applied; and better methods have prevailed because of increase of knowledge on the subject. Literally, millions of dollars yet remain uncovered in these ancient river beds, offering an alluring prospect to mining men.

A big scheme in drift mining has recently been inaugurated by Messrs. A. N. Towne, J. B. Wright, J. J. Crawford, F. S. Chadbourne, M. R. Higgins, and T. H. Williams Jr., gentlemen all very well known in California. They have made several locations along the McRea Ridge in Plumas and Sierra counties. Besides, they have (or are supposed to have) bonded the adjoining properties of the Beckwith Consolidated Mining Company, and the Franklin Consolidated Mining Company, for $75,000 each.

It is declared to be the intention of these capitalists to drift into the McRea Ridge, which no doubt covers an ancient gravel channel. This is the country from which large nuggets of gold were taken a few years ago—one valued at over $3000. These were taken from what is snpposed to have been a break from the ancient channel in McRea Ridge. One company realized over $50,000 in four years, though working in a small way only.

It takes money to prosecute drift mining, and the names of the gentlemen interested is a guaranty that it will be furnished in sufficient quantities, if it is once decided to develop the claims.

THERE are prospects that those persons opposing free raw materials in the Wilson bill, iron and lead ore, lnmber, etc., will concentrate their efforts to secure changes in the bill in the Senate. Delegations representing these various interests will be in Washington during the coming week to begin the work, Democrats, as far as possible, being delegated to make the protests. John M. Burke of Idaho, the advance guard of the lead men, is there and will be joined in a few days by others representing the States of Montana, Wyoming, Nevada and the Territory of Utah. Burke says free lead ore will absolutely paralyze the mining industry of the States and the Territories named. If the duty on lead ore cannot be retained, in part at least, by the Wilson bill, the lead miners will ask for the retention of the duty of 2 cents on pig lead, reduced by the Wilson bill to 1 cent. An effort will be made on the part of the representatives of the several interests to the combine so as to secure concerted action, but whether the combination can be effected is uncertain.

ADVICES from South Africa are that serious rioting took place at Johannesburg, Tuesday, December 26th, among the natives at Witwaterstrandt. The natives who were engaged in the disturbance were mostly employed in the mines and numbered about 2000. About 100 men are said to have been wounded, of which six are seriously injured. The rioters also sacked and tried to destroy one of the pnblic buildings, but were eventually dispersed by special police. These are simply meager details which may be greatly exaggerated, bnt they seem to indicate the continuance of serious differences between the whites and natives, which will eventually end in the displacement of the native labor. There has been a large influx of miners into the Transvaal, and it was and is inevitable that there should be a conflict between them and the natives for work in the mines. In such a contest the weaker nation invariably goes to the wall.

E. C. ENGLEHARDT of Deadwood, Tobias Gaster of Lincoln, Nebraska, and Dr. J. A. Paddock of Deadwood, have established metallnrgical works and a laboratory at Denver for the testing of gold and silver ores and investigation of leaching processes, such as the Russell, cyanide and improved chlorination process discovered and patented by Mr. Englehardt. To coin a word, bromineation is to be the method. Chlorine is not used in any manner. Several propositions for the use of the procees are said to be under consideration by the owners. The proposals come from Montana, Colorado, Utah, the Black Hills, and from every mining district in America letters of inquiry as to its adaptability to ores are received. At the works, tests of 100 to 1,000 pounds of ore will be made and the owners informed of the cost of treatment.

CHARLES F. HOFFMAN will read a paper, entitled "Notes on the Golden River Drift Mine, Better Known as the Red Point Mine," at the meeting of the Technical Society of the Pacific coast on January 5th.

The Mother Lode.*

By Dr. Stephen H. Emmens.

Traversing the lower portion of the foothills in a line parallel to the main chain of the Sierra Nevada is an east-dipping belt of slates and eruptive rocks, which continues without intermission for more than 100 miles across the counties of El Dorado, Amador, Calaveras, Tuolumne and Mariposa. Chief among the members of this belt is a graphitic slate seamed with veins of quartz and bordered by walls of greenstone. This quartz-seamed and greenstone-bounded band of slates is the great "Mother Lode" of California, and is deservedly famous as the richest gold-bearing formation of equal magnitude that has ever been discovered in the whole history of mining. Owing to the softness of the slate, as compared with the quartz and greenstone, the outcrop of the mother lode is conspicuously marked from place to place by huge white or green rocks rising boldly from the surface of the ground.

The quartz bodies of the mother lode occupy fissures in the slate and greenstone. These fissures are irregular, and sometimes cross the slate in both dip and strike; but for most part they are conformable. I regard the veins thus formed as being distinguishable into the following four classes, viz.:

1. The hanging-wall veins. These are mainly contact deposits between the slate and eastern greenstone, and are almost always regarded as the principal veins in Amador county.

2. The foot-wall veins. These are discontinuous bodies of limited extension, both longitudinally and vertically, and are found at various distances west of the hanging wall.

3. Caunter-veins. These are bodies that cut across the slates in dip and strike, and are usually of minor importance except as stringers and feeders, which, if followed, frequently lead to large masses of ore at their lines of junction with the other veins.

4. Greenstone veins. These are quartz-filled fissures in the greenstone walls. In bygone years they were almost completely ignored or disbelieved in; but modern developments have shown that they are of a very great value.

An inspection of plates I and III published in this paper last week and plate I in this issue will enable an accurate idea to be formed of the ore bodies in the mother lode.

Plate III is a view taken at the end or "breast" of the level now being driven south on the hanging-wall vein of the Mayflower mine at a depth of about 300 feet from surface. In the upper left-hand corner the smooth and regular hanging wall itself may be observed, and under this is seen the huge mass of slate and quartz forming the vein, while on the right hand are timbers that serve to keep the level open.

Plate I shows the breast of a greenstone vein lately discovered in the 800-foot level of the Gover mine. The walls are not seen, as the vein is some 50 feet in width. It consists of an almost solid body of rich gold-bearing quartz, and is found continuous down to the 1000-foot level, which at present is the deepest working. This magnificent bonanza, when first met with, consisted of a mere seam in the greenstone, and in the early years of mining on the mother lode would have passed without notice. But Mr. A. B. Call, the superintendent, and Mr. Robert McF. Doble, one of the directors of the Gover mine, very judiciously determined to drive north on the seam, and were rewarded by finding it widen out into one of the finest ore bodies ever discovered.

The plate in this issue shows a large caunter-vein at the 300 level in the Mayflower. It has no well-defined walls, and is virtually an interlaced network of veinlets and patches of gold quartz disseminated through the main body of graphitic slate for a width of about 14 feet. A comparison of this with plate I will enable the laminated character of the slate breast to be distinguished from the massive appearance of a solid body of quartz. At the top of plate III is seen one of the cross timbers supporting the roof of the drift, and at the bottom is some flooring for facilitating the work of shoveling up the ore.

Experience in all parts of the world has shown that the metalliferous veins of each mining district have local characteristics; and a knowledge of these distinctive features is required for the efficient development of the mines. The history of mining on the mother lode in Amador county is an excellent case in point. For many years the gold deposits were believed to be more or less superficial and pockety, and immediately a vein became poor in depth or longitudinal extension it was abandoned. At a later date the wisdom of driving levels along poor veins until they opened out and became rich again was recognized; but the idea still prevailed that it was hopeless to pursue them in depth. Finally, a few adventurous spirits were enterprising enough to take up some of the abandoned shallow mines and sink the shafts a few hundred feet deeper. They then discovered that the barren zone was of no great magnitude, and that a second series of rich ore bodies existed below. It is now recognized by every mining or geological expert who has examined the mines of Amador county that there are two zones of gold ore in the mother lode—one extending from the surface to a depth of usually 600 or 700 feet, and the other commencing at about the 1100-foot level, and extending to a depth at present unlimited. The Eureka mine, for example, at Sutter Creek, about two miles south of Amador City, has rich ore in the bottom level at 2200 feet from surface. This rule of the two zones is so general that as yet no exception is known. *Every* mine on the mother lode that has had rich ore at surface or in shallow levels, and has been sunk a few hundred feet below the line at which the shallow ore "petered out," has proved richer in depth; and as there is no claim on the whole course of the mother lode which has failed to yield rich ore in its upper portion, so it may be said with literal accuracy that there is no claim on the mother lode which will not prove successful if properly developed. I have never yet heard of or met with any other mining district of equal extent of which the same assertion could truthfully be made, and in this respect the mother lode stands unique as a field for the *certain* and *profitable* investment of capital. In saying this I of course allude to mines which *really* are situate on the mother lode. Claims are often located on side veins and deposits, and are boldly dignified by the title of mother-lode mines; but no competent expert need have any difficulty in distinguishing their true character.

It must not, however, be understood that the two gold zones are marked out in a precise and unvarying fashion. This would be impossible in any large geological area where the forces producing fissures and vein-matter have operated over many miles of country and through rock masses of diversified character. In some places the upper and lower zones approach each other very closely, and the intervening barren ground is correspondingly decreased; while in others there are found "chutes" or "chimneys" of rich ore which descend without a break from the upper to the lower zone. These chimneys are generally of comparatively limited length in a horizontal direction, and have a northerly dip. Their values are always large, and sometimes reach into the millions.

But while the methods and notions of the early miners have thus been advanced upon, and properties which they abandoned have been re-opened and made highly productive, the progress achieved still leaves untouched some important elements of value. Exploration on the mother lode has been confined too much to the hanging-wall and foot-wall veins, and as yet no mine can be cited in which there has occurred any systematic development of the "caunter" and "greenstone" veins. The importance of these is only now beginning to be recognized in spite of many chance discoveries which ought to have opened the eyes of the miners. For example, I was told by one of the old miners in Amador City, who was one of the men concerned, that in the early days of Bunker Hill—now the "South Mayflower"—a drift on the hanging-wall vein was inadvertently carried on into the greenstone and there struck a body of ore which was so rich that it yielded $2000 in gold for every barrel full. Yet this was looked upon as a mere "pocket," and when it was worked out no attempt was made to drive on the vein that led from it into the greenstone north and south.

Again, in the same Bunker Hill mine, a small caunter vein was accidentally encountered in the 400-foot level. It was driven on for a few feet, and then widened out into a body of fine milling ore, 40 feet in width and yielding $14 per ton in free gold. This bonanza lasted down to below the 500-foot level and yielded enormous profits. It was found to split up into stringers and to thus "peter out" into the surrounding slates above and below and at its two extremities, but its lesson was not learned. No systematic driving on caunter veins was undertaken, and such other bonanzas of a like character as may exist are still remaining untouched for the present owners to discover.

The discovery of the greenstone vein in the Gover mine, shown in plate I, is another instance of neglected opportunities. I was, by the courtesy of Mr. Call and Mr. Doble, allowed to personally inspect the mine, and trace the vein from the point where it was first cut to the present workings. I found the vein in question to be a striking protest against the notion, so cherished of miners, that exploration should cease when a well-defined wall is reached. On the mother lode, in particular, this theory has been rampant and delusive. Immediately a fine, smooth hanging-wall of hard greenish rock is met with, the crosscut is suspended and drifting commences along the wall. And yet, on close scrutiny, it is frequently possible to observe a distinct slaty structure in this greenstone—a structure quite distinct from that of the massive, granular, crystal-filled diabase that forms the true boundary of the lode. Where such slaty structure exists, a path of low resistance is provided for the occurrence of fissures, and it becomes highly probable that the same forces that fissured the slates simultaneously rent the slaty greenstone. But the driving of a crosscut through a solid hanging-wall into the greenstone behind has been too pestilently heretical a proceeding to have found favor in the eyes of "practical miners;" and there is not a mine on the mother lode that has ever been thoroughly prospected in the eastern or hanging greenstone. The new bonanza at the Gover may be expected to change this state of things; and the stock-holders of the Mayflower gold mine and the Chicago Gold Mining Syndicate need not regret the past neglect, seeing that the eastern ground has thus been allowed to remain untouched for their benefit.

*Dr. Stephen H. Emmens, the chemist and consulting engineer, who is now in this city as manager of the Mayflower gold mine, Amador county, and Chicago Gold Mining Syndicate, has just issued a report to the stockholders of the Mayflower and South Mayflower gold mines. It is in neat pamphlet form, embellished with numerous half-tone engravings from photographs by N. W. Emmens, showing several interesting geological features of the mother lode in the vicinity of the mines; the underground workings of the Mayflower and adjacent Gover mine; the surface works; water power ditches; Amador City; and other scenes likely to be of interest and value to the stock-holders. The matter of the report has been presented in most excellent style. It is finely classified, and carefully prepared. The situation is first described. It embraces a hasty sketch of the topographical features of the Sierra Nevada mountains. Then come the geological features of the mother lode; then the history of the two mines; their present condition and prospects; their workings; mill and chlorination works; and concluding remarks. The above are, slightly abridged, Dr. Emmens' views of the mother lode.

Senator Chandler, of New Hampshire, proposes to introduce in Congress a resolution asking the United States to invite all the countries of the world—Eastern, Western and Southern—to attend a monetary conference. The new feature of the proposed conference is that it shall not be restricted to European gold-standard countries, but shall include South American and Oriental silver-standard countries. Moreover, the invitations to the conference are to contain the declaration of the United States that the purpose of the conference shall be the establishment and maintenance of an international ratio, with a specific declaration added that, if such a ratio cannot be agreed upon, it will be the purpose of the United States to adopt a single standard, and that standard not gold, but silver. By taking this extreme position, not as yet advocated in Congress even by radical silver men, Chandler thinks the hands of the gold-standard countries not now trading extensively with the Western world can be forced.

The Denver plant of the Omaha and Grant Smelting Company has completed a statement of the ore receipts and production of metals for 1893. The total production of silver was 7,591,425 ounces, an increase of 116,148 ounces over 1892. The production of gold for the year amounted to 82,404½ ounces, an increase of 19,202 ounces. These figures, however, are not an indication of the growth of gold or silver mining; they are simply a statement of the business of one large smelter. Other smelters have been shut down.

Foundry Notes.

The Union Iron Works has launched the new pilot boat Gracie S. The new "No. 3" is to take the place of pilot boat George Peabody, which was lately sold, and is considered the crack boat of the pilot fleet. Her cost was $17,000, and when launched she was fully ballasted, equipped and ready for sea. She is named after the eldest daughter of John D. Spreckels.

A representative of the Electric Storage Battery Company of Philadelphia recently held an interview with Vice-President Huntington of the Market Street Railroad Company and presented the merits claimed for his system. During the course of his remarks the representative stated that his company would guarantee its system to do the work at the expense of 3½ cents a mile. Mr. Huntington asked the gentleman if he would enter into a contract to supply the Metropolitan line with power, but the storage-battery man said his proposition only applied to roads on a level. In discussing the storage-battery question Mr. Huntington said that he believed the system would be perfected at some time in the future so that it would be available for roads with at least moderately heavy grades.

The first heavy piece of armor was placed on board the Monadnock, at the Mare Island yard, last Saturday morning by the aid of the large shears under which the monitor had been hauled the day before. The piece is what is known as the conning tower, a circular structure some 5 feet in diameter and 7 feet high, weighing 45,000 pounds. The next piece of armor to be hoisted on board will be the smoke-pipe armor, an oval piece of metal weighing 45,000 pounds. Twenty-one pieces of armor for the sides, weighing over 500,000 pounds, have already arrived, and more are on the way from the East. It is expected that about the middle of next week the monitor will be floated in the drydock, and five of the stern pieces of armor will be set in place. A derrick has already been erected on the deck of the vessel for use in this purpose. When the large crane now under construction at the East is completed, it will be sent out to the yard and used for all such heavy work as this. A track will be especially laid for holding the jib-crane. It will be a year before it arrives and becomes ready for operating. In the meantime wooden shears will be used, of the same style as that now seen on the stern of the Monadnock.

The Miners and the Farmers.

TO THE EDITOR:—If there are any of the hydraulic miners who are credulous enough for one moment to suppose that the strenuous opposition of part of the people of Sacramento valley to the resumption of the hydraulic mining has subsided, let them carefully peruse the report of the convention held in Sacramento last week, for the purpose of devising ways and means for the improvement of the rivers. Here are some extracts from speeches delivered by gentlemen who have been prominent in the crusade against this system of mining. W. S. Green of the Colusa *Sun* said: "Placer had put up money two years ago, but that was on the occasion of a grand handshaking business between the miners and the farmers. The valley is not going to throw down the glove to the miners now at all." Doctor Dixon remarked, "that he did not favor hydraulic mining, which destroys the rivers, but if the miners will assist us, for God's sake let them do it." Good Grove L. Johnson, the Blackstone of Sacramento, complacently remarked that he "looked upon the miners as natural enemies, but he was in favor of letting them in if they will give any money. The miners will get all the chestnuts and the valley all the fire." The miners, he said, "have no interest in this plan, except as individuals of California." He was convinced "that the best way would be to stand alone." Senator Rose of Colusa, said "that Placer had failed to send a representative; and besides, she was not interested in navigation." And it was decided to leave poor Placer out in the cold. These quotations were culled from the *Bee* of the 16th inst, and like the proverbial "straw," indicate the course of the anti-debris wind. They give unmistakable evidence of the deadly antagonism which still lurks in the breasts of the miners' ancient foes.

As already stated, the vigorous opposition arose over the attempt to place Placer county upon the executive committee of this body. The object of Placer in being represented upon this committee I fail to comprehend, but the attempt to make Judge Fulweiler an executive member has proved the real *status quo* of the controversy. The sentiments expressed are indicative of the course to be pursued by the Anti-Debris Association. We are clearly given to understand that in the great fight for supremacy—in our efforts to secure the rehabilitation of a legitimate industry that was suppressed through the efforts of a few professional agitators of the Sacramento valley—we must expect little sympathy or assistance from the hands of the farmers.

Two years ago, at a convention held in San Francisco, the miners extended to their opponents the right hand of fellowship in *prisca fides*. They were prepared to bridge the chasm which had separated them so long and were willing to accept any measure that proved satisfactory to both parties. They informed the representatives of the valley interests that they would abide by the judicial decisions affecting their interests pending legislation by the National Government.

That the miners have "kept the faith" is a matter of history. That the farmers, or their representatives, have been as unfaithful as the miners have been faithful, is also a matter of history. Their action in Washington and also in Sacramento, is conclusive proof of this statement. They have done more to injure mining—hydraulic and quartz mining both—than any other agency or influence in this State. Because of the agitation which they have conducted against hydraulic mining, the impression prevails in the East, and in Europe, that all kinds of mining are illegal in this State, and millions of dollars of capital have no doubt been perverted as a consequence. They have succeeded in suppressing an industry that was capable of producing at least $10,000,000 annually. They carried matters with a high hand for a while. They dictated to the hydraulickers just what they should and what they should not do. But there is an end to all things. And time brought an end to the rule of the Anti-Debris Association. The unjustness of their position was apparent to every fair-minded person. The appeal of the miners to Congress and the State Legislature was successful, despite the determined opposition of the paid agitators of the valley. They were given ten years in which to make good their promise to compensate the commerce of the State, to the amount of the loss sustained through the suppression of hydraulic mining. Have they done so? Have their products increased to the amount of $10,000,000 annually? Commercial statistics fail to reveal the fact, and the miners challenge them to produce any evidence that will show increased production in their industries other than in proportion to the increased production caused through the march of modern progress.

Is it not only just and logical, then, in view of the circumstances, to revert to the system of hydraulic mining? It is imperatively demanded. Commerce demands it. The people of the whole State demand it. And it is the height of presumption to think that the Sacramento valley is greater than the State of California. But they cap the climax by their audacity in asking the miners to contribute money to defray the expenses of their campaign.

SAMUEL BUTLER.

Grass Valley, Cal., Dec. 18, 1893.

The Mining Exhibit.

The Midwinter Fair management has delayed the formal opening for a short time, though the gates will be open January 1st. The reason is that the exhibits are not in place and the buildings are not all finished, though very near completion. The delay will be only for a few days. The time of opening will be announced later.

The mining exhibit is making excellent progress, and it will undoubtedly be one of the great features of the exposition. Supt. Benjamin has shown himself to be possessed of great energy and administrative capacity, while the executive committee has discharged its task faithfully. The oft-repeated statement that the exhibit of minerals in bulk and quality will be the finest ever made will be fully verified. It is the purpose of this paper to give a complete review of this part of the fair.

The stamp-mill will be placed in a building by itself. It was feared that the incessant pounding of the stamps would interfere with some of the electrical apparatus and connections, so it was determined to erect a building just outside of the Mechanic Arts building on the south. The structure will be 26x50 feet in its dimensions, and it will contain a complete quartz-mill outfit with the latest appliances for working all kinds of gold-bearing ores. It is also the intention to show the different processes for treating and saving the gold. Large quantities of ore are being shipped from the mining districts to be worked in the mill during the Fair.

Nevada county has adopted a handsome design for the individual exhibit, Architect Swain having made the plans. The prominent feature will be a large gilded sphere, supposed to represent a solid lump of gold of the value of $250,000,000, this being the amount of the total gold output of the county since mining began there.

Appeals have been made to the principal mines of the State to donate three tons of ore each, to be crushed in the five-stamp mills which will be operated as a portion of the mining exhibit. As each lot is being crushed an announcement will be posted indicating the mine from which it comes and the result of the milling. The product of the ore will go to the mining exhibit fund.

Tuesday, May 22d, is to be "Miners' Day," and the committee in charge of the mining exhibit is already arranging for the occasion. One of the entertainments will be the great contest in rock-drilling, to determine the championship of the coast.

Alameda county is to make a showing of some of its mineral resources. M. H. Mendenhall of Livermore has promised to send large quantities of chromium manganese, building marble and magnesia from the vicinity of Agua de Vida Springs, and the Treadwell gold mines will also make an interesting showing.

The foundations for the machinery operating plant of the exposition are now complete, and the engines are being placed as rapidly as possible. Work on the boiler plant is well under way. The shed which is to cover these boilers will not be erected until they are in place, but if it is found necessary to have power some of the boilers and engines will be utilized before the building is erected, by the adjustment of a temporary trestle on which to hang the piping.

THE annual meeting of the Ophir Mining Company was held recently, when 81,652 shares of the 100,800 were represented. Directors were chosen as follows: Charles H. Fish (President), Nat. T. Messer, William S. Lyle, C. O'Connor, Herman Zadig, George R. Wells and A. W. Havens. E. B. Holmes was retained as Secretary, D. B. Lyman as Superintendent and the Nevada Bank as Treasurer. A cash balance of $3302 was reported. Only 49 tons of $19 ore was crushed during the year. Two assessments of $75,600 were collected in the last fiscal year. Another of 25c. per share has been levied.

THE Clayton Air Compressor Works has issued, in pamphlet form, a very useful pamphlet on the "Widening use of Compressed Air," written by Whitfield Price Pressenger, and published in the *Engineering Magazine* for November, 1893. It is a review of the many purposes to which compressed air can be applied, and especially for power purposes.

THE Altura Gold Mining Company, capital stock $250,000, and the Vanderbilt Mining and Milling Company, capital stock $1,000,000, have filed articles of incorporation; both at San Bernardino.

The Grass Valley District.

EDITORIAL CORRESPONDENCE.

GRASS VALLEY, Dec. 15th.

A large share of the activity which has marked mining operations during the past two years in the Grass Valley district has been on Oshorne Hill. The history of the various mines on the hill has been a record of profit up to a certain point, and then for various reasons, some sufficient and others not, they have been shut down. In early days Osborne Hill was the scene of immense activity and general prosperity, the various properties being as a rule highly remunerative; but it seems that after a depth of a few hundred feet the rock became hard and seemed to be growing more rebellious as sinking was pushed. It had not been demonstrated in Grass Valley that deep mining was profitable, and no effort appears to have been made on Osborne Hill to reach great depths. About 25 years ago there began to be a cessation of operations on the hill. One by one shafts were allowed to be filled in and water to possess the workings; there seemed to be no future for Osborne Hill, and for years it was little more than a golden memory. Not more than two years ago L. P. Goldstone, a well-known mining man, obtained possession of the Osborne Hill mine and started to re-open it. New steam hoisting works and pumps were erected and preparations made on a sufficient scale to demonstrate the value of the property. After a careful study of the Grass Valley district Mr. Goldstone had become fully convinced that no mine which discovered a good pay shoot within a few hundred feet from the surface would fail to disclose another at lower depths. The experience of other miners amply demonstrates this theory, and the Osborne Hill is now fairly on the way to be added to the list of rich mines. At the time I visited the Empire mine the mill of the latter was engaged in crushing rock from the Osborne Hill, and it was stated that the rock was very rich and returns of gold heavy. The surface works at the Osborne Hill mines are run by steam, and it is likely that the expense of mining was one of the factors in their closing down in early days. Other mines on the hill which have undergone much the same experience as the Osborne Hill may be mentioned. They are:

The Green Mountain, which has been shut down about 12 years. The shaft is now down about 400 feet and there is no doubt of the value of the property.

The Centennial mine, near the summit of the hill, and adjoining the Osborne Hill on the same ledge, has a record as a producer of about $500,000, and has paid $200,000 in dividends. In early times the mine was especially profitable—under another name, however—but, when in 1876 it was consolidated with adjoining properties, it was appropriately called the Centennial. In 1882 the mine became involved in litigation and operations were suspended. Within a few months past the property has passed into the hands of a Sacramento company, and active development is now being made. John N. Larkin is president of the company and A. W. Stoddart superintendent.

The Conlin mine, west of the Osborne Hill, has a new ten-stamp mill, and is a very promising property. The capital for development has been furnished largely by New York and San Francisco people.

The Orleans is a very large property, comprising a number of locations. The new hoisting works have just been finished. Sinking is now going forward on the Madison Hill location. The mine has been idle many years, but the owners are firmly convinced that it will develop into one of the best properties in Grass Valley district. The history furnishes ample ground for their faith.

The foregoing do not include all the mines now in course of active development, or rather redevelopment, on Osborne Hill; but they are sufficient evidence of the awakening which has taken place in this portion of the Grass Valley district. Considerable outlays of capital have been necessary in each instance, and employment given to many men. There is sound reason now to anticipate that the mines will prove steady and profitable producers and play a prominent part in the future history of Grass Valley.

A great deal of speculation has recently been directed toward the old Alison Ranch mine, on Wolf creek. This property was once one of the famous mines of California, if not the most famous; but many years ago, from causes not very well understood, operations were suddenly ceased and the workings allowed to fill up. It is said now that the mine has fallen into the hands of J. B. Haggin, A. E. Davis and others, and that they will in the early spring begin active work. The value of this property is not at all a matter of uncertainty; it is well known, and it is necessary only to put in the requisite works and reopen the mine in order that it may yield certain returns.

James D. Hague, Esq., principal owner of the North Star, has recently acquired possession of the Rocky Bar mine, on Massachusetts Hill, and it is stated also that he now owns the Stockbridge, Great Britain and New York Hill, and will work them all. Like other properties which have been mentioned, these have records as producers, and will doubtless contribute much in future to the material growth of the district.

E. B. P.

At the Midwinter Fair.

The time is at hand for the opening of the Midwinter Fair, and preparations are going forward with surprising speed. Things have been accomplished in the art of construction which seem almost incredible considering the days involved. Fortunately for the enterprise, we have had a season of exceptional salubrity, and each day finds some new building roofed from the floods which in the nature of things must soon come.

Our engravings are in part a demonstration to distant readers of the actuality of the enterprise. The upper plate of pictures is made from photographs of the buildings themselves, taken about December 1st, and not from architects' perspectives, so the views are real. One thing, however, is lacking in these reduced views, and that is that they do not carry the impression of size which the buildings themselves convey to the beholder. The buildings represented in the small pictures occupy the same correlative positions that the pictures hold, and the general view, including the three, is such as the beholder would get by looking from the Administration building the length of the central court upon the distant Manufactures and Liberal Arts building, which is the greatest structure on the grounds. It is probably a quarter of a mile distant from the camera. On right and left, in nearer view, are the two buildings next in size, that for machinery and the one for agriculture, while beyond the latter is the Egyptian style of building devoted to the fine arts.

The second plate on this page shows the building constructed by joint subscription of northern and central counties for the special display of their productions and resources. The southern California counties are also erecting a building of their own.

Much cannot be said of the beauty of the building in construction by the northern and central parts of the State. It will serve, however, as a neat and commodious pavilion, in the interior of which it is hoped the visitor will find greater interest than in its exterior. It will be 180 feet in greatest length by 150 feet in greatest width. The different counties participating in its construction have been awarded space as follows: Yuba, 950 square feet; Napa, 1400; Solano, 1400; Sacramento, 1400; Placer, 900; Butte, 900; Colusa, 900; Shasta, 250; Siskiyou, 250. This will not, of course, include all the counties exhibiting, for county exhibits will doubtless form a leading feature of the main exposition building devoted to agriculture. Our engravings are reproduced from the *Midwinter Exposition Illustrated.*

Placer County Quartz Mines.

TO THE EDITOR:—Although quartz exists in nearly every portion of Placer county, the majority of the located quartz claims are situated in the Ophir mining district, three miles south of Auburn, the county seat.

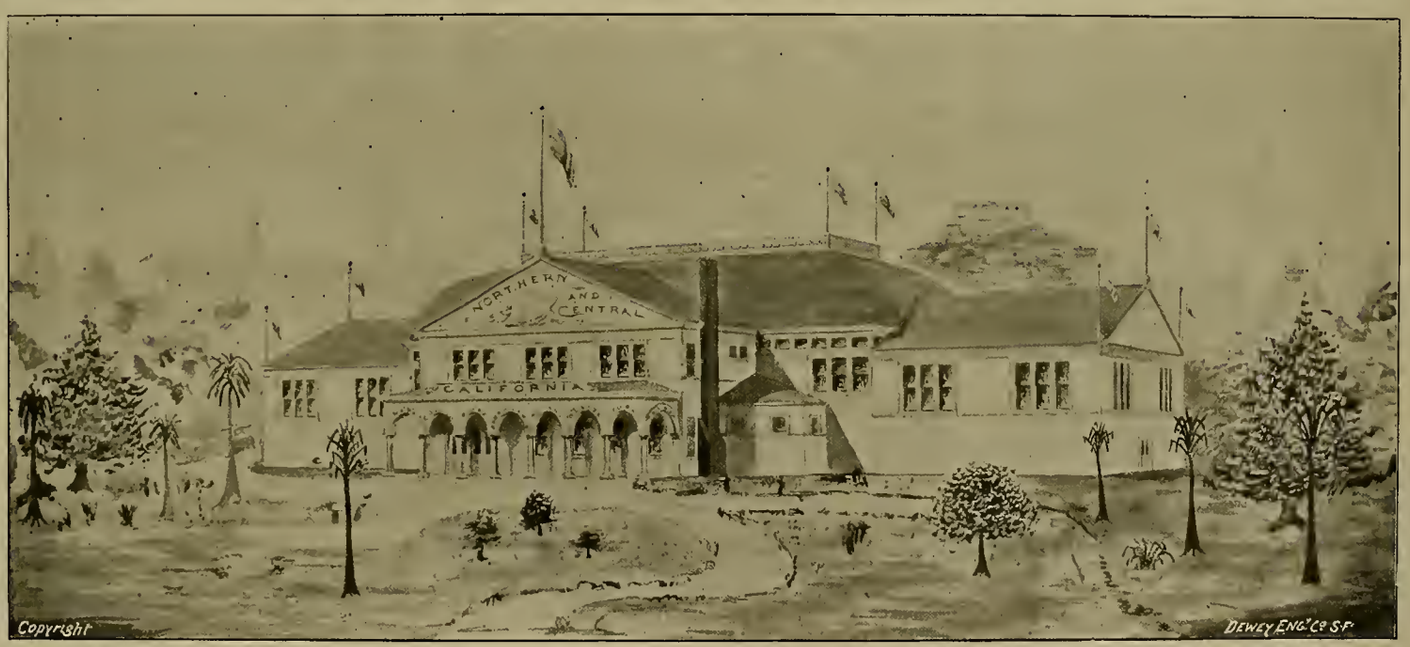
Ophir abounds with many claims that have produced gold in large quantities, the majority of which are not at present operated. But few claims in the district have been worked to a 300-foot level. Good paying rock was to be found in many of the mines when they closed down, but, with the increased cost of taking it out, under the directions of kid-gloved superintendents, the returns were not large enough to pay large salaries and heavy running expenses.

The section has often been called a specimen camp. The term hardly does the district justice. While it is true the richest ore runs in chutes depending upon the character of the granite formation, nearly all of the rock will pay a small profit when milled. It would seem as though the fact that the camp is but a mile from a railway station, and therefore easy of access, serves to work against it. Mint receipts show that a vast amount of gold has been taken from the mines of the district. "Distance lends enchantment," and it is the opinion of the writer that if the section was difficult to reach capital would be freely invested. However, the camp shows a change for the better, as is evidenced by the fact that work has recently been resumed at several mines.

Arrangements for work on an extensive scale are being made at the Three Stars mine, recently sold by B. F. Hartley to the Gold and Silver Mining Company of Colorado. Mr. Hartley has been chosen as superintendent. The ledge is one of the most prominent of its kind in the county, from four to eight feet in thickness, and stands in some places as high as 15 feet above the natural surface of the ground Pipe has been laid for a distance of 5000 feet to convey 60 inches of water, with a fall of over 300 feet, to furnish power to run the machinery. Shafts 1, 2, and 3 are being sunk. When the main shaft has reached a depth of 200 feet, drifts will be run the entire length of the lead, a distance of 3200 feet. The mine will have four Huntington mills of 100 tons capacity, Burleigh drills and an electric plant.

Work on the Hathaway mine has recently been resumed with Wm. Irwin as superintendent. He is working the mine on a lease in company with Martin Jones. They are now at work on the 200-foot level and 16 men are employed. Ten stamps of the 20-stamp mill are working an average of 18 hours per day. The ore averages $8 per ton exclusive of the sulphurets and the outlook is encouraging.

At the Boulder mine, which will be operated by D. H. Hutcheson and Luke Ferguson, the machinery for the hoisting works has just been put in place. The machinery will be run by water-power and they have just finished laying 2000 feet of nine-inch pipe with a pressure of 270 feet. An eight-stamp mill will be operated with two concentrators. Hundreds of tons of rich ore is in plain view. The present working force of twelve men will soon be increasing.



NORTHERN AND CENTRAL CALIFORNIA BUILDING AT THE MIDWINTER EXPOSITION.

At the Eclipse mine the mill is running on custom rock. This mine was purchased by Daniel Buck in 1890, who died two months later. He willed it to Dr. Wm. Blankman of San Francisco, the present owner. A superintendent under Mr. Buck took out 100 tons of ore that he estimated would go about $3 per ton, which remained in the mill. The estate is still in probate, but an order of court was secured by the present superintendent, Ben Hawkins, to crush the 100 tons, which averaged $27 per ton. W. R. Monahan and Ben Hawkins cleaned up $1176 in February, 1892, from 30 tons of waste rock which was thrown over the dump. Monahan is still working the waste rock on a percentage.

Adjoining the Eclipse is the Morning Star. The ledge runs from six inches to four feet, but the prevailing width is two feet. The main shaft is down 92 feet, with a drift running west 50 feet. A second shaft 70 feet east has reached a depth of 75 feet. The mine is at present worked by a

lease. Mint receipts show results from several crushings as follows: 128 tons, $7387; 34 tons, $382.33; 6 tons, Nov. 1, 1893, $582. The ore on the chute has run from $6 to $166 per ton, and has averaged $57.50. A portion of this mine is situated on land listed by the railroad company as agricultural lands.

Also inside the surface lines of the Morning Star is a part of the famous Good Easter mine, which was a large producer twenty years ago, but it is idle at present. A spur of the lead runs parallel with the Eclipse, and two years ago a connection was made from an Eclipse shaft to a perpendicular shaft on the Good Easter. It was very rich, but neither the owners of the Eclipse or Good Easter were gainers, as the honest miners retained it. The waste dump afterward paid $100 per ton. This mine is now filled with water.

J. Holbrook has four men at work at his June Bug quartz mine, and the main shaft has reached a depth of 108 feet. The ore looks very promising. About $75,000 was taken from a shaft 50 feet west some years agn.

J. W. McCullough, superintendent of the Mina Rica quartz mine, is running their ten-stamp mill on custom ore. The mine, whlch ls at present idle, has a 250-foot shaft, with 500-foot tunnel; also levels at 100 and 150 feet.

Wm. Pellow, who now owns the California mine, is working the waste rock on the dump by the arrastra process. The ore yields a steady average of $6 per ton.

The Bellevue extension on the east, owned by Edward Tremmelling, is being worked only by the owner. The main shaft is 180 feet, with drifts 70 and 80 feet east and west.

The Moore mine, owned by J. W. White, T. M. Tharpe & Son, is being worked by the owners. The ledge runs from 4 to 10 inches in thickness. They have reached a depth of 300 feet on the incline. At the 200-foot level an 80-foot drift is stoped to within 100 feet of the surface. Specimens of the ore are so rich that the owners crush them in a hand mortar, and they have pounded out during the summer more than $4000. While your correspondent was on the ground they were eogaged pounding specimens which wielded 108 ounces. All quartz aside from specimens has milled about $100 per ton. In sinking to the present depth the present owners have taken out over $40,000. Mrs. T. M. Tharpe has a cabinet of specimens taken from thls mine which is vaiued at $15 000.

Parallel with the Moore mine may be found the Centennial, Hope and the Conrad, all idle properties, but I understand that San Francisco parties will back mining superintendent Fred Dependener, who will soon have a force of men at work on the Conrad.

The Green mine owned by F. X. Lavalee, which has produced well ln early days, is not being operated at present.

J. Malmberg, who owns the Baltimore quartz mine on Baltimore ravine, has recently sunk a 20-foot shaft. The ore shows free gold and looks very encouraging.

Tharpe & White are opening an old tunnel on the Cox & Denton mine, owned by Mrs. Dr. Crandall, and will work it on a bond. The ledge runs from 18 inches tn three feet, and has paid some $40,000 at former workings.

George J. Morgan, owner of the New Year, Argonaut, Flat Lead and The Wilson, is doing no work on tbem at present.

N. Maring & Son, who own the Bullion, have a shaft that has reached a depth of 100 feet with a 50-foot drift. The ore has milled from $13 to $40 per ton, with sulphurets at $100 to $300 per ton. They are doing no work on the mine. IVAN H. PARKER.

Penryn, Cal., Dec. 23, 1893.

A New Road to the Yosemite Proposed.

Our readers in Stanislaus and Merced counties will be interested in tbe statement which is currently made that the Southern Pacific is considering the construction of a new branch road into the Yosemite valley, starting from a little south of Modesto and crossing the Oakdale branch near the town of Montpelier and thence up the valley of the Merced river to the Yosemite valley. This branch will be about 90 miles long. It will traverse a most important agricultural district, as well as unlock vast stores of lumber, building stone and minerals. It will also be a great boon to the traveling public, as it would allow one to reach the Yosemite valley in about 12 hours from San Francisco, so that a city man could leave town Saturday evening, pass Sunday in the valley and be back again at his work Monday morning. Something of this kind would be of vast public benefit. The present routes to the valley are too costly both of time and money.

THE DeLamar mines produced between March 1st and November 30th of this year 349,785 ounces of fine silver, amounting at par to $402,237. It has been sold, say at an average of 70 cents, amounting to $243,849 50, making a difference of $158,387.50 to the stockholders of the mine.

Hydraulic Mining.*

A REVIEW OF THE INDUSTRY BY DR. HENRY DEGROOT.

In Eight Parts—Part I.

Hydraulic mining consists of that method of handling auriferous gravel whereby the deposits in place are broken down and carried into the gold-saving apparatus by mean of water discharged upon them through iron pipes and under great pressure.

This system of gravel washing, which had its orlgin in California, was the result of fortuitous circumstances rather than foresight or design, its basic idea having been suggested by the merest incident. So obscure was its genesis that we cannot at this date determine just where or by whom it was first brought into use, several different persons and places laying claim to this distinction—so many, ln fact, and each with snch apparent good showing as to justify the suspicion that its lntroduction in these various localities might have been concurrent events.

As the discovery of this method was due to accident; so has its subsequent growth been the creature of evolution. From the smallest beginnings it grew little by little every year, bringing with it some lmprovement and adding something to lts efficiency, until it reached vast capabilities and gigantic proportions. Gradually the canvas hose has been developed into the giant nozzle, a single set capable of doing the work of a thousand men.

Among the many notable exploits for which our mechanics and engineers have been distinguished, the planning and perfecting of this process of gravel washing, with its attendant system of reservoirs, ditches and equipments, stands conspicuous, both as regards inventive ingenuity, daring engioeering, and the many novel expedients to which recourse has been had for overcoming seeming impossibillties.

Nothing appears to have been too vast for these men to undertake or too difficult for them tn perform. Great flumes bracketed to the face of tremendous cliffs, immense water flows transmitted by depressed iron pipes across yawning chasms, and trestle works lifted high in the air like the arc of the rainbow spanning deep gorges, stand monuments of their skill, eoergy and daring. So new and astounding have been some of these feats, we might almost fancy that nature, were she a sentient and conscious entity, shocked by their audacity, would eodeavor to administer a suitable reproof to the presumption of man. We pride ourselves, and justly, on these achievements, many of which have inured tn the benefits of the world at large no less than to the glory of California.

Few persons know—hardly any of those best informed understand—how great a destiny awaits the industry. It has a mission as wide as the world. It is going out to glean, or rather harvest anew, the ancient placers and even the gold fields of prehistoric times. It may be put to death here where it was born; here where it was cradled it may die.† Mankind have a habit of crucifying their saviors, and the prophet is not without honor save in hls own country—sayings fated perhaps to illustrate what is here in reserve for this method of gold mining. Be this as it may, though interdicted in the land of its nativity, other nations will have need for it; nations whose placer deposits were impoverished long ago to a degree that prevented their being worked by the crude and primitive methods then in vogue, hut which can now be rehabiiitated and made to pay worked by this better plan.

Europe, Africa and India were great gold-producing countries from 2000 to 4000 years ago, incredible quantities of the yellow metal having been gathered there by the more enlightened nations of those days; so, also, were Mexico, Central and South America, prior to the discovery nf the new world. Such having been the case, it is reasonable to infer that there exists in those countries deep gold-bearing gravel banks, similar to those found in this and other of the Pacific States. That no mention has been made of thelr occurrence is explained by the fact that in the absence of any means by which they could be profitably utilized they were supposed to possess no value, just as this class of deposits would have been considered valueless had never water under pressure been substituted for manual labor, and thus an amazing economy been worked in the manner of handling them.

In the early times alluded to, whole armies of men, usually slaves or prisoners of war, were employed in tbese mines, which, worked in this manner, yielded bountifully and witb large profit to the owners, or those who farmed them for the government. Sn far as the several last named countries are concerned, they are known to abound with these deep placers, some of which are now being exploited by the hydraulic process.

Only the past summer the announcement was made that a party of mining experts and engineers, sent by a New York syndicate to examine the foothill region of the Andes, in the Republic of Ecuador, found there an extensive district of auriferous gravel well adapted for this style of mining, these experts giving it as their opinion that there can be made by a single ooe of the several of the properties they have secured an annual output nf ten million dollars in gold-dust, and that at a cost of less than one million dollars, interest on capital included. These placers have worked from time immemorial, it being from this westerly slope of the Andes that the Incas of Peru obtained their great store of gold, afterward wrested from them by the Spaniards. These deposits are believed to stretch along the Piedmont region of the great South American Cordillera for hundreds of miles, constituting by this continuity one of the most extensive gold fields in the world. They have the same relative position to the Andes that our main gold belt has to the Sierra Nevada.

Nor are these hydraulic gravel banks confined to the countries mentioned. To whatever quarter of the globe we direct our attention, we fiod there this class of deposits of greater or iess magnitude. They reach with interruptions from equatorial Africa to Arctic Russia. They are present in Australia and probably also in that other great island continent, New Guloea. They are known to exist in Siberia, China and Japan, to say nothing of British Columbia, Alaska and other localities nearer home. What is left to these older countries of their former placers is now remuneratively worked by the contrivances and methods heretofore employed. Introduce there our California apparatus, and the output of gold would soon be greater there than ever before, and that this will be done in the early future admits of no doubt. In such wide distribution of the royal metal, there is lnsured for this industry a life as long, and a production as large, as await any other form of gold mining extant; and if hereafter, when in the new and distant fields into which his enterprise may carry or his fortunes cast him, the hydraulic miner shall find this article very helpful in the planning and construction of his plant, then will this writing have served its purpose, at least in part, and another of the aims of the Mining Bureau have been accomplished.

Some of the tabulated statistics including also certain other data contained ln this article have been taken from Bowie's Treatise on Hydraulic Miniog, a wnrk recognized by both the engineering profession and the practical miner as standard and authorative.

Terms and Phrases Used in Hydraulic Mining.—The business of hydraulic mining having during its formative stages been largely in the hands of men non-professional and little conversant wlth scientific nomenciature the names given to many of the structures, impiements and operations connected therewith were so lackiog in technical exactness as to require a little explanation. Some of them were unheard of, having been original in their conception or suggested by some mere incident—more often perhaps by the exigencies of the occasion. Though generally appropriate and nften highly expressive, certain of these terms to the unfamiliar ear may seem little better than barbarisms, which they really were at the time of their inception, though now, through long usage, they have come to be recognized as bnth legitimate and useful. The most of them have, in fact, been naturalized and admitted to the great republiic of letters, through their introduction into all modern dictionaries. And thus do ianguages grow, nur own having been much enlarged and somewhat enriched through the introduction of new or foreign words incident to the discovery and subsequent history of gold mining in California, these foreign wnrds having been mostly derived from the Spanish, from wbich tongue we have the terms bonanza, borrasca, stamped, batea, arrastra, etc. Besides these, which pertain to mining, our vocabulary has been much augmented by other words taken from the Spanish, some Welsh and German words of like purport having been engrafted on our Mother tongue. "Prospect," "prospector," "color," "show" and the like, though good English, are used by the miners in a sense different from that usually attached to them.

The "prospector" is one who goes out to search for mineral deposits of whatever kind. If successful in finding what he is after, the quantity so obtained is denominated a "prospect" or "show," meaning the showing such mineral substance makes. If the "prospect" consists of particles of free gold, small and few in number, the find ls styled a "color." Auriferous gravel in the parlance of the prospector is "dirt," and if rich enough to warrant being worked, "pay dirt." The term "grade," as understood on the Pacific coast, signifies usually a fall of 12 inches in 12 feet, the

*This article was prepared by the late Dr. De Groot for the Eleveoth Report of the State Mioeralogist, just issued; hut its publicatioo with that of much other valuable matter was prevented by the necessity of revisioo and omissioo, so that the volume might be reduced to reasooable limits. It covers familiar ground, hut is, on the whole, a complete and careful review of the iodustry aod hydraulic-mining methods. The article has heeo furoished this paper by State Mineralogist J. J. Crawford.

†It seems unoecessary to say that Dr. De Groot's article was writteo before the Camioetti act was put in practical operatioo.

latter being the length of the sinice box first here in use, hence this measnrement of grade. Terms pertaining specially to hydraulic mining will be explained hereafter, as they occnr in the text; though, while on this subject, it may be observed that the retention of the letter *k* in spelling the word *hydraulicing*, after the manner of most writers is not to be commended, snch use of this letter being wholly superfluous and contrary to modern nsage, it having ln all analogous cases been dropped by the American, if not also by most English lexicographers. Formerly the words hydranlick, mnsick, publick, etc., were all spelled after the manner here given, nor can we see any good reason why this letter should be dropped from the word in its verbal and be retained in its participial form, as this change alters it neither in sense nor sound.

To the washed gravel discharged from the miner's sluice or other gold-saving apparatus has been applied the term "tailings," hydraulic tailings being further distinguished as debris or detritns, the name "slickens" having also been sometimes given to this waste matter. This name being, however, both snperfluous and ontlandlsh, has come to be generally discarded.

How widely in meaning some of the words above alluded to differ, as employed by the miner and the man of science, is shown in the inch of water, which, as understood by the schooled hydraulic engineer, represents the quantity of that fluid which escapes per minute from a circular aperture one inch in dlameter, its center being 1½ lnches below a constant surface; whereas, the miner's inch of water, measured by the rule most in use in California, means the quantity of water that flows from an opening one inch square through a two-inch plank with a head six inches above the center of the orifice, the water being at rest. Different methods of measurement obtain, however, among the several water companies throughout the State, the quantity represented by a miner's lnch varying from 1800 to 2600 cubic feet per 24 hours' flow. These companles, acting in the start without concert or much theoretical knowledge on the subject, adopted each such system of measurement as seemed most convenient or as fancy might suggest, and, although efforts have been made to establish a uniform rule either by general consent or legislative enactment, this has not yet been effected.

The "duty" of the miner's inch, being the quantity of gravel it ls capable of breaking down and carrying off in the course of 24 hours, varies according to the character and condition of the material to be handled, grade of sluice, style of riffles, etc., ranging all the way from two to twenty cnbic yards, the average being about four.

The average in seven different localities in this State as estimated by the State Engineer, amounted to 3.6, as shown in the table appended:

Name of Stream.	Inches of Water Used in 24 hours.	Duty per Inch—Cubic yards.	Amount Moved—Cubic yards.
Table Monntain	833,250	3½	2,916,375
Butte Creek	24,000	3	84,000
Feather River	1,259,363	3½	4,407,770
Ynba River	5,468,171	3½	19,103,598
Bear River	1,117,082	3	3,351,246
Dry Creek	44,229	3	132,687
American River	1,914,500	4½	8,615,250
	10,650,596	3.6	38,610,926

The above result, 3.6, is somewhat below the general average in California, rendering it probable that the gravel run off in maklng these tests was coarse and heavy, if not cemented.

At the Hobson mine, Iowa Hill, Placer county, piping a bank of light gravel using 500 inches water, on usual sluice grade, and under a pressure of 360 feet, the duty of a mlners' lnch was found to be 24 cubic yards, elevatlng here the grade to 18 lnches and substituting iron riffles for the rock pavement. The duty was raised to 36 cubic yards, this experiment illustrating the gains due to the introduction of these new factors, the average result of the two trials being 30 cubic yards. Running on coarse bottom gravel, thls company under same conditions was able to move only ten cublc yards.

At the North Bloomfield mlne, Nevada county, handling 1,500,000 cublc yards top gravel, the duty of the inch was 5.39 cnbic yards, while running on the lower and more lndurated stratum, extending to a height of 65 feet above bedrock, the duty of the inch was reduced to 2.34 cubic yards, the miners' inch here being equal to 2.230 cubic feet.

THE work of preparation for the State mining exhibit is progressing eatisfactorily, though funds are eomewhat slow in coming in. But it is safe to eay that the exhibit will be altogether the best and most complete ever made. Space hae been assigned to counties in the mining exhibit as follows: Nevada county, 840 square feet; Amador, 464; Calaverae, 464; El Dorado, 420; Butte, 367½; Sierra, 348; Shaeta, 348; Plumas, 304½; Kern, 210; Tuolumne, 288; Siekiyou, 171; Contra Costa, 176; Inyo, 216; Mariposa 130; Merced, 75; Santa Cruz, 95; Santa Barbara, 95: San Diego, 90; Mono, 180; Mendocino, 22½; Lake, 57.

Cost and Profits of Good Roads.

Now that there ls an agitation throughout the State for better roads, and as at least one connty (Sacramento) has taken steps to carry through a bonding proposition for road buildlng, the following, which we glean from Eastern jonrnals, will show that similar ideas are being orged in the older States: It seems that in Monroe county, New York, road supervisors, connty commissioners and citizens were called together, and it was found that they could build an arterial system of county roads, radiating from the city in all directions to the bounds of the county, and connecting all considerable villages and towns with each other and with Rochester; that such a system could be built for just about one per cent of our valuation, which was then one hundred and thirty millions and is now one hundred and fifty, and for that amount—now one million, five hundred thousand—we could build a first-class telford road costing ten thousand a mile, to the extent of 150 miles. My idea was, said Mr. J. A. C. Wright of Rochester, that a board, composed by the supervisors, could, by filing a map in the county clerk's office, thereby make any road a county road; that they should secure a competent county engineer and should direct him to map out a system of county roads, which should include all the main roads of the county—first, for purposes of general care and repair; and, secondly, with a purpose of building these up into new-made telford roads, or as many of them as advisable, so soon as one such road was a success and approved. Such an idea was a revolution of our present system, and was a bold scheme, perhaps, in that we were unaccustomed to it, but one which would be found the most satisfactory and cheapest in the end. It showed that the cost of this system, 150 mlles even of good telford road, if carried at four per cent would be a charge of 40 cents per thousand of assessed valuation, being $2 per year upon a farm assessed as high as $5000, and only 40 cents per year upon the owner of a small house assessed at $1000 in the city.

Mr. Wright further stated that in hls opinion every county should build permanent roadways at an initial cost, bonded, but for the present merely to carry the indebtedness, and the increased valuation and wealth brought in would be sufficient to establish a sinking fund, which would ultimately wipe out the principal. When built these roads should be put in immediate, single systematic supervislon; divided into sections slmilar to railroad care and repair, but, unlike railroads, more elastic in the employment of local material and help. For example, the farmers could use the stone from their fields, their teams and their labor in the building, and when the roads were built an intelligent farmer could be selected as roadmaster of contiguous sections, his work telling when under the direction of an expert road-maker. In other words, the money raised by the community would be reimbursed to the community.

Major M. H. Crump of Bowling Green, Ky., speaks of the roads of that commonwealth, and he gives figures that are of the greatest interest and importance. I quote direct from him: "Kentucky, whlle it has some good roads, has many of the worst in the world, largely due to its miserable system of working them. Warren county, the seventh in the State in point of wealth, spends from $12,000 to $15,000 per year in labor and money on its roads and bridges. At least $10,000 of this is absolutely thrown away. There are mud holes with 500 yards of rock in them, now two feet under the mud. A road convention met in Lexington, December 20, 1892, which considered the Sims road bill, now before the Legislature, and which radlcally changed the old and inadequate system, as it permits the counties to levy a tax not exceeding 25 cents on $100, to be expended by a competent engineer, under the supervision of the fiscal court of the county.

"All roads are divided into three classes, and all work must be done by contract to the lowest and best bidder, and will be carefully inspected by the engineer in charge; all able-bodied delinquent tax-payers will be compelled to work out their taxes on the roads. By this law, and with the $15,000 now expended, seven and one-half miles of superior telford road can be built, at a cost not exceediog $2000 per mile, or 15 miles of good road at $1000 per mile

"In the last ten years I have constructed over $200,000 worth of telford and gravel roads, at the above fignres; and when good limestone can be had within one mile of the road, a sixteen-foot road with an elght-inch pavement and four inches of metal can be built easily. This includes everything, grading and all, on old roads, when the grades cannot be greatly chaoged.

"I usually estimate the cost of grading and shaping the roadbed (22 feet wide for a 16-foot roadway, and 24 for an 18-foot bed) at $200 to $500 per mile.

Telford paving costs per square rod:	
Stone paving eight inches deep, eight cubic yards put down at 50c	$4 00
Metal paving four inches deep, four cubic yards put down at 50c	2 00
	$6 00
18-foot roadbed:	
340 square rods per mile at $6	$2,040 00
Grading and shaping roadbed	200 00
	$2,240 00
(Laborers usually negroes, at $1 per day.)	
16-foot roadbed:	
310 square rods per mile at $6	$1,860 00
Grading, etc	200 00
	$2,060 00
Gravel roads, 16 feet, 2 inches ground	$1,000 00
Grading, etc	200 00
	$1,200 00

"Many miles of 18-foot stone roads have cost less than $2000 per mile. Many miles of 16-foot stone roads have cost less than $1600 per mile. These macadamized roads were constructed by county aid, $1000 per mile being allowed on each complete mile, when not less than three miles were assured. Bonds, thirty year, five per cent, sold at par and were taken by citizens of the county, so that not a dollar went beyond the limits of the county. Warren county has expended $60,000 in this way, and the county levy has been decreased every year since the roads were completed."

Sliokens.

THE Gold Poiot Gold and Silver Mining Company, at Grass Valley, bas selected the following Directors: Samoel Granger, James Watt, James Bennallack, F. S. Richards, A. B. Brady. The board organized by electing Samuel Granger, president; A. B. Brady, secretary; James Watt, treasurer; James Bennalack, snperintendent. The company has received a patent for the Helphine gronnd, and before loog work may be commenced on the Gold Point claim.

AT the aonual meeting of the Monnt Diablo Mining Company 38,626 shares of the capital stock of 50,000 shares were represented. The old Board of Directors was elected, consisting of George W. Grayson, J. M. Sbotwell, Captain J. N. Koowles, Lewis Teese, Jr., and R. W. Heath. J. M. Shotwell was elected president, Captain J. N. Knowles vice-president, R. W. Heath secretary, and Bank of California treasurer. The company has a cash balance of $6481.27 on haod.

THROUGHOUT Leadville, Colo., district there is quite a noticeable display of activity despite the nnfavorable conditions that confront the mining industry. This is to be accounted for in a very large measore to the stimolus exerted by the resnlt of the development of the gold properties in the district. In the vicinity of the American smelter a mill is in process of erection for the treatment of gold ore by the cyanide process, the intention being to make a specialty of Cripple Creek ore.

THE principal mines of the State are asked to dooate not less than three tons of ore eacb, to be crushed in the five-stamp mills which are to be operated in the mining exhibit during the continuance to the Midwioter Fair. As each lot of ore is being croshed and redoced an annonncement will be conspicnously posted, informing visitors whose rock is being operated npon and the result of the milling. The product of the operations will be added, as has been previously annonoced, to the mining exbibit fond.

THE following were elected trnstees at the receot annoal meeting of the Kennedy Mining Compaoy: John Barton (president), D. E. Hayes (vice-president), John Taylor, F. Reichling, and W. W. Belshaw; L. F. Reicbling was chosen secretary and J. F. Parks snperintendent. For the fiscal year eoding November 30, 1893, the mine yielded 35,668 tons of ore. The face valne of the gold bullion after paying cost of assay and express charges to San Francisco was $645,552. Dividends of $460,000 were paid. The company has a 40-stamp mill, and the mine is in Amador connty, California.

HAMILTON SMITH, mining engineer, has recsotly sobmitted a report of his operation of the Alaska-Treadwell mioe for the first five months of the cnrrent fiscal year, say from April 1st to October 31st, doring which intsrval 100,502 tons ore was crushed, yielding $356,227. The expenses for that period were $122,227, leaving a profit of $234,000, against $168,477 for the corresponding period last year and $180,708 in 1891. On May 15th the soperintendent estimated that there was 1,768,000 toos of average ore in sight above the 110-foot level, besides a large quantity of poorer ore. In the coming year, it is proposed to open a level at 220 feet, when a furtber large body of ore is expected to be exposed.

SUIT has been begun at Pbœnix, Arizons, to contest the ownership of the Mammoth mioe on the ground of priority of location. The plaintiffs are A. B. Coosor and otbers, local mining men. The defendants are the present owners, C. L. Hall of Denver, Dennis Sullivan of Leadville and Henry McCrea of Washington, D. C. The location was made by the plaintiffs of the Big Four mining claim in September, 1892, and the location of the Mammotb is alleged by the plaintiffs to be the same as the Big Four, made two months later. The present owners of the Mammoth bought the claim from the original locators last Jnne for $30,000, and within the past month are said to have refused an offer of $750,000. The result of the suit is awaited with great interest, as nomerous other claims in the same district are likely to come into litigation.

REPORTS from the Integral qnicksilver mine, Trinity county (recently described at length in this paper) are that the preparations for more extensive development are practically completed, and the main shaft is being sunk at a rapid rate. The surface works are in operation, the pomps going and the new furnace will be started about Febroary 1st. Among other things a track has been laid from the lower tonnel to the bunkers, about 400 feet, and it has been completely covered over, so that operations will not be interrupted by snow. The Integral Company has provided comfortable qnarters for its men, and a postoffice has been established at Integral. Ample snpplies are on hand for the winter. It is expected that the fornace capacity will be increased to keep np with the most speedy development of the mine consistent with circnmstances. A fine specimen of ore from this mine is to be seen at the store of Miller, Sloss & Scott, 12-14 Pioe street, San Francisco.

Scientific Progress.

Man's Place in Nature.

President David Starr Jordan of the Stanford University lectured last week at Golden Gate hall in this city on "Man's Place in Nature." "Huxley's essay, published 15 years ago, really tells all that the scientists of to-day know," said the speaker. "No positive new light has been thrown on the subject since then. The study of heredity has been taken up to a great extent, scientists preferring to work upon something which will give results, of which the study of man's origin has not been particularly productive. Homology is the stamp of heredity, and the nearness of blood relationship is proportioned to the closeness of homology.

"At one time, when teaching in an Eastern medical college, an alligator from Florida was given me to dissect for the students. They crowded around, all expectant as I dissected the beast, anticipating the sight of some unusual internal organs. But none of any marked prominence were found. The students had to look most carefully to notice a slight difference in the heart and diaphragm of the alligator to those of a human being. Homology has but one explanation. We believe we are all descended from the common stock, and have but one reason for believing so. By the law of continuity, if in 19,999,999 species of life homology means blood relationship, it must indicate the same in all other cases.

"Darwin concluded that if each species arises through natural law by processes of orderly change, then man must have thus arisen. The homology of man with the ape family indicates common heredity. Hence both man and apes are from some simian stock; not the same as any apes now living, for all show marks of divergence, but from some stock that we could call monkeys; a stock, according to Darwin, that were arboreal, hairy, long-armed and had moving, pointed ears. On this latter peculiarity there exist at this day men who can move their ears in a like manner to Darwin's prehistoric man-ape. Darwin thought also that man at one time had a tail, and the latter-day theory is that human beings still have tails, which have shrunk away so as not to project beyond the skin. The question as to what has become of the tail is one of later development, but as many monkeys were and are tailless, argument is productive of nothing.

"A group of man primates may be said to be composed of lemurs or semi-apes, new world monkeys, old world monkeys and man. In general structures man goes with the old world monkeys. One great authority so grouped the higher order of mammals, and took the stand that the orang-outang was more akin to man than the common monkey. The lemurs or semi-apes were monkeys without any of the mischievous or cunning habits of the latter-day monkey. In special development lies the great hiatus between lemurs and apes. Another division apparent is the low or high brain capacity of the lemurs as against that of man and the new world monkeys. In the lemurs it was wholly undeveloped. Man goes with higher forms, as an old world ape. If we were not a prejudiced party, and not our own classifiers, we would not hesitate in acknowledging our brotherhood to these creatures.

"Now touching upon an attempt to separate man as a group from other primates: The difference in structural distinctions is slight. In the embryo man and all animals the tail is just alike. The hair—extremely specialized in higher races. Some are well covered, all monkeys are so, and the hair cells on our bodies are the same as those of monkeys. Toes—monkeys have used their great toe as a finger for climbing, and that member has always showed out prominently. In an Asiatic race at this day the great toes stand out larger than the others. Attitude—that of man becomes more erect, but the apes still shamble and shuffle along. The jaw—that of the larger apes is greater than the human jaw, but in the smaller monkeys there is not so great a difference. The prominence of the eyebrows goes with the development of the jaw, and skulls of the larger apes have been obtained the eyebrows on which were plainly visible looking on the back of the skull. The brain in normal man is much larger than in the normal ape. The brain of man is growing. Admitedly so. Then on that admission we must allow that original man's brain was no bigger than an ape's. A big monkey's brain of this age will compare very favorably with that of some pigmy men of Africa.

"Mental differences, speech—All races of man have some forms of speech. The higher animals sing, roar, growl or emit noise. As to a monkey's speech, we must wait till the result of Professor Garner's investigations are all known. Garner insists that apes can talk and that he can follow their speech, and until evidence to the contrary is forthcoming his statement must stand.

"The use of tools—The most primitive man knew the use at least of flints for producing fire; monkeys have not been known to use flints or any tools to prepare anything. They may sometimes use an article for some visible purpose, such as to throw a tool, but no more. Affection—The possession of it by man needs no reference to. Apes show affection by jealousy, and Rudyard Kipling, in a true story, describes the exhibition of a tragic power in a monkey's affection. The intelligence shown by an ape is that of a narrow-minded, short-sighted old man.

"My own belief is that man was a nomadic ape, but not hairy-tailed. That man's body came from the lower ape forms is likely, but the intellect had an introduction quite separate." The professor concluded his lecture by quoting the closing paragraphs of Darwin's well-known "Descent of Man."

Whence the Water of the Great Lakes.

Where do the waters of Lake Michigan come from? is an old question, and it is a question as old as the artesian wells, says the Chicago *Herald*. Where do their waters come from? Colonel Foster, an eminent civil engineer, for many years in charge of Government interests on the lake, was fond of talking on the first subject. "Every drop of those waters," he was often heard to declare, "came from the Rocky mountains." His theory was that they were brought here subterraneously, but he never, to our knowledge, marked out the course of the subterranean stream.

He announced that as his conviction long before—indeed, he died before—the sinking of artesian wells in Chicago, and the consequent discovery of the now undoubted fact.

William B. Ogden held the same view, and used at times to make himself very interesting in expatiating upon it. With him, as well as with Colonel Foster, it was no more than a theory, but he adhered to it firmly.

Mr. Cregier, who is scientific before he is a politician, is wont to talk approvingly of the theory in a manner to convince any man.

The phenomenon is the running out of this lake through the others of the easterly chain and over Niagara Falls of an incalculable quantity of water, and this continually every minute in the hour, every hour in the day, every day in the year, and every year in progressive time!

The lake has no visible inlets; where, then, does it get its replenishment? From the Rocky mountains.

Through rents and crevices, down into caverns at the roots of these mountains, pour ever the waters from melting snow. Four thousand feet they sink to strike a gravity incline that levels with their floor under Chicago.

Under this city and elsewhere on the west side of Lake Michigan this is the proved theory, theory as good as proved—the snow-covered Rocky mountains are constantly sending their waters to supply flowage and evaporation that is ever going forward in the watery expanse.

Ocular Aperture.

It has been remarked by an authority on the use of the rifle that persons whose eyes have small pupils usually make the best shots, says the *Optician*. And in riflemen's "orthoptics," as is well known, we meet with a practical recognition of the same idea. It leads to the inference that, owing to the automatic adjustment of the iris, there must be more certainty in aiming at a small dark object against a light background than *vice versa*. Passing for a moment to the matter of telescopic gunsights, we may observe with what facility the advantages of such could be obtained by means of the compound spectacles or eyeglasses. There is one point worth noticing here, which is the greater perfection with which glasses for looking at distant objects only can be corrected—the angle of view being so small that, for the front lenses, the rays are practically parallel. Of course vision is always best in the optical axis of a spectacle lens, and this must be borne in mind in the case of riflemen who wear spectacles habitually. Their orthoptic discs should be so constructed as to be fixed rigidly to the spectacle frame, between the glass lens and the eye.

Mechanical Progress.

Effect of Temperature on Iron.

An official report of the tests recently made at the arsenal at Springfield to ascertain the effect of temperature on the strength of iron has appeared, says the *Manufacturers' Gazette*. The specimens were heated by rows of Bunsen burners, which were arranged in a muffle, and the temperature of the test specimens were judged by their observed expansions. Each piece was heated to the temperature of the test before being strained, and its expansion determined by a micrometer, and the coefficient of each grade of metal having been determined before the tests began the temperature could be inferred with considerable precision.

An abstract of five of these tests—the temperatures being all on the Fahrenheit scale—is in evidence that the strength of steel is greater at about 500° than it is at 70°. These five series of tests were made with five different qualities of steel, containing respectively .09, .20, .31, .37 and .51 per cent of carbon, and the percentage of strength was obtained by dividing the tensile strength of a sample of steel at the given temperature by the strength of the same quality of steel at 70°. The result presents the interesting fact that the specimens in question were all stronger in the neighborhood of zero than they were at ordinary temperatures—all of them, in fact, showing a minimum of strength at 210° or thereabouts, and a maximum of strength at about 550°.

To Save Rails.

The latest practice in the economy of rolling stock on railways is to turn the cars at the end of each trip, whereby a large percentage of extra wear and tear is saved, says *Iron Age*. Some years ago a portion of the Wabash railroad was laid with old English iron rails and a small part with steel rails from the Carnegie mills. It became necessary after a time to remove some of the main line rails to another part of the road, and it was observed that after relaying them many gave out immediately, while others manifested no signs of wear. To determine the reason of this apparently unaccountable condition, an investigation was ordered, which showed that the road from which the rails had been removed was built in a northwest-southeast direction, and that, in relaying, a large number had been turned end for end. Those that had not been so placed exhibited no additional loss by attrition, while the turned rails succumbed in from 30 to 90 days. The conclusion arrived at was that the metal had become polarized from long use, when first laid, and that the fiber was broken up by the traffic in the opposite direction. It was further proved that cast-iron wheels generally yielded twice the mileage when the cars were turned at each end of the journey than when they were run backward and forward without reversing. Notwithstanding the value of this discovery, it was not universally utilized, and it is only recently that some of the American railroads have begun to recogoize its importance.

Smoke Combustion.

In operation in the power plant of the Laocashire (England) *Evening Post* there is a new system of smoke combustion. The apparatus is fitted in a furnace having bars four feet long. The height from the bars to the top of the furnace is 15 inches. About seven inches from the far ends of the bars an arch is placed five inches deep. By means of this arch the smoke is turned downward, upon and through the fire. Below the bars a door is placed about three feet from the front, whereby the amount of draught allowed at the back of the furnace is regulated, and a more equal proportion forced up the front. By this door the bars are kept cool, owing to the additional quantity of air, and thus preserved, and the air is thoroughly mixed with the smoke as it passes through the fire, thereby assisting in its combustion. It is estimated that by the use of this system a saving of over 25 per cent has been effected. The quantity of smoke has been greatly reduced, and the residue from the furnace in the shape of clinkers has been reduced 50 per cent. While this does not wholly dispense with the smoke difficulty it is a long step in the right direction.

A New Self-Oiling Box.

Something new in a self-oiling box has been brought out by a Pawtucket inventor. The device prevents the oil from running out on the shaft, and in this feature would prove valuable in weaving mills where the dropping oil is liable to spoil goods.

Another feature of this box is the manner in which the oil is transferred from the reservoir to the shaft, making it impossible for the felt or wicking to glaze over and become useless, as is often the case after a few months' run. Then, too, the box is a labor saver, in that it runs a long time without refilling; all dust is kept out, and the oil continually in motion does not thicken.

The oiler does not have to keep climbing up to the shaft to see how nearly empty the box is, or to put in more oil, which may run over and down on the floor, for the oil reservoir has a chamber in which is an indicator plainly visible from the floor, so that the oiler may pass along the line at a fast walk and tell exactly in what condition all the boxes are.

New Use for Bronze.

It is well known that the bronze made of nine parts of copper and one of aluminum is of the color of gold and will not tarnish. It is of tensile strength equal to steel. At this time this metal can be produced in castings for about the same price that crucible steel costs, and the castings can be made very true to pattern. Why do we not use it and save the expense of working to shape? asks the *Journal of Commerce*. And why do we not use it for the improved artistic effect its color will give?

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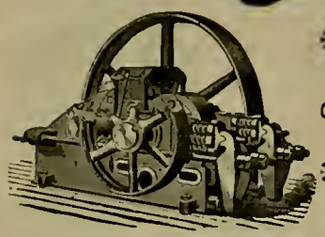

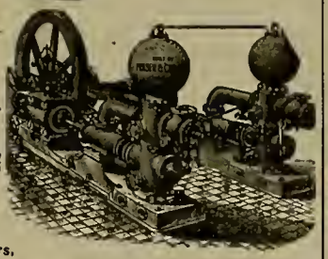

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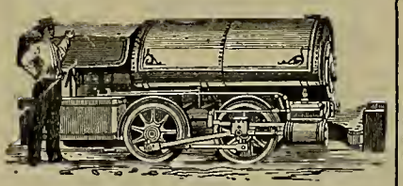

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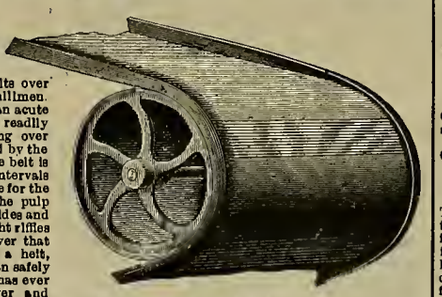

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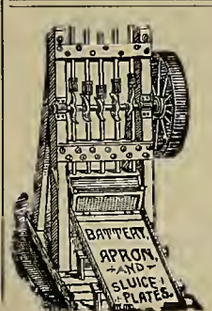

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Useful Information.

Treatment of the Foot of the Horse.

The importance of the frog should be known to every horseman, says the *Rider and Driver*. It should never be touched with a knife, as it breaks the jar to the coffin joint in coming in contact with the ground, and from its elasticity it allows natural expansion—this being the great function of the frog when the horse is in motion. But if the shoe is so constructed that it closely fits each side of the frog, then the iron shoe controls the elasticity of the foot, and so induces the first step in contraction. So the shoe, properly applied, should follow the gradual curvature of the wall of the foot, taking care to give the frog plenty of room to perform the functions already indicated.

The horse should be shod once a month, and when shod very little alteration is necessary on the foot. The rasp is the only tool necessary to be used. The scooping out of the sole of the foot with the knife, or mutilating the frog in any form, should be carefully avoided; and owners and blacksmiths, if they observe these hints, will find in consequence less lameness connected with the horse.

When horses first become feverish, the simple remedy is just to stand them in mud—yellow clay—up to the fetlocks. This reduces all local inflammation.

The treatment for thrush in the frog of the foot is quite simple. The foot should be poulticed with flaxseed meal for twenty-four hours. This treatment softens the parts and reduces the inflammation. A dressing of fine tar and oakum should be applied. This is all that is necessary to complete the cure.

The remedy for scratches I give for the benefit of the horse. It is to apply simple white lead with a painter's brush—and nothing else. No surer remedy has ever been suggested. All that is necessary is to continue the treatment till cure is effected, which will occur in from six to seven days.

Corns in the foot of the horse should never be cut out, as by this means support is taken away from the wall of the foot and a receptacle is created for the lodgment of dust and gravel, which are very penetrating and may cause separation to take place between the wall and the sole. The part of the heel affected with the corn should be lowered and a side-calk put on the shoe, thus relieving the part from pressure and keeping the foot soft. The attainment of this result is all that is required. It may be accomplished more readily by using a wet swab or by poulticing.

Horses foraging should be shod light in front and never behind.

Horses that interfere should be thoroughly examined in regard to position of the foot on the ground. If low on the inside, they should be raised from the point of the toe to the heel, thus widening their gait. This mode of treatment will effect a cure, except in cases of abnormal construction or bulld.

The Cure of Colds.

The season of colds is here. People are always complaining about sore throats, about colds in the head which are started from the throat, or live in constant dread of specific throat affections, such as quinsy or diphtheria. It is due to the unnatural habit of eating most forms of food and drinking many sorts of drinks in an excessively hot state. Many men would get in a towering passion if the soup at dinner was anything below scalding heat, and many women would feel that their tea was not worth drinking if it had got down to anything like the heat of the body, says the New York *Commercial Advertiser*.

It is quite easy to illustrate the sensitive nature of the back of the throat. If a soft cloth be dipped in cold water and applied to the abdomen for a short time it will at once be seen that the delicate rosy tint of the lining at the back of the throat has changed to a deeper red, and if the cold application be retained sufficiently long in its position by dropping on iced water this red color will still further deepen, till distinct inflammatory symptoms will appear; these can be removed by substituting a warm poultice for the cold application, and the throat will regain its normal color if a definite inflammatory stage has not been reached.

This illustrates very well the mode of treatment which should be used in cases of inflammation of the throat—that is to say, that warm applications, such as poultices or fomentations, should be applied to other parts of the body and especially to the abdominal region. When the throat has been weakened by the use of bot foods, inflammatory symptoms are very often caused by a chill to the front of the body. Ulcerations of the throat are very often caused by drinking impure water. The utmost care should be taken to see that all water be boiled before it is used, or that it be taken in that peculiarly valuable state, namely, the juice of fresh ripe fruit.

Another cause of throat trouble is the presence of carious teeth, for we not infrequently find that some of the diseased matter proceeding from them lodges in the folds of the membrane lying in the throat, and there sets up an irritation which may develop into a serious sore throat.

The last point to mention is the value of oils and fats for the throat. Their effect is not wholly understood, but that they have a very soothing one in case of irritation, and a strengthening one in case of illness, is beyond a doubt.

One of the best forms to take oil is to drop a little fine olive oil on the back of the throat when the head is held back, and then allow it to find its way down by repeated swallowings. Half a spoonful taken in this way three times a day has often a most wonderful effect in strengthening the throat, in putting an end to that rough tickling which is so distressing a cause of cough and in generally soothing the organs with which it comes in contact.

Increasing Use of Spectacles.

A writer in the *Atlantic Monthly* for November argues very clearly that eyesight is not steadily tending to the bad. This writer on spectacles tells us that the present-day common use of spectacles is entirely due to modern science. In former times young people with defective eyesight were not aided simply because they were young. Spectacles were for aging or elderly people. The consequence was that many young people received permanent injury or loss of eyesight because it was assumed that tender years and wearing of glasses were incompatible. There is no doubt that the great advances made during recent years in sight-testing, and the reduced price at which good spectacles can be vended, have done much to popularize the use of aids to vision.

To Cut Stone.

A circular saw which is claimed to cut stone with remarkable efficiency has been invented in France. Its edge is set with black diamonds in the same way as the straight blades; but as the strain on the diamonds is all in one direction, the setting may be made much firmer. This is a good invention, says the Chicago *Journal of Commerce*, but, before it was devised in France, a similar saw was invented in America, as far back as 1865, by E. S. Drake, who, in the March of that year, patented "a stone-cutting circular saw with black diamond teeth."

Inequality of Vision.

According to a German doctor, who has just published the results of a long course of experiments on this subject, the sight is rarely alike in both eyes. He finds that only in one case out of fifteen are both eyes in good condition. In seven cases out of ten one eye is stronger than the other. In two cases out of five, patients are affected with astigmatism, which may be defined as an imperfect focusing of the light rays entering the eyes. This usually arises from a difference in the curvature of the cornea, or transparent portion of the front of the eye. Nearly 50 per cent possess only imperfect appreciation of colors.

Electricity.

An Interesting Experiment.

M. Blondlot has been experimenting in an interesting line of electrics. He describes some experiments which he undertook to determine the rapidity of propagation of an electric disturbance along a copper wire by means of a method independent of theory. With lines of unequal length he found that the results were so nearly alike as to show that the propagation movement is tolerable uniform. In two lines, of 1115 and 1973 yards, respectively, he discovered speeds of 183⅛ and 183¾ miles per second. Unfortunately M. Blondlot's method of arriving at these results is not given, adds the Chicago *Journal of Commerce*, but it is interesting to know that they correspond perfectly with those be had previously obtained by another method. It is also stated that these experiments have had the advantage of being independent not only of theory, but also even of the existence of electromagnetic oscillations and undulations.

Artificial Sunlight.

In a dark room with alternating currents of 800,000 voltage, Nicola Tesla, by means of atmospheric vibrations, caused a faint glow of light to appear. Explaining the phenomena, he said: "If I can increase the atmospheric vibrations, say one million or ten thousand millions, I can produce sunlight in this room. Of course I can increase the vibrations by increasing the voltage. I can make the voltage 8,000,000 as easily as 800,000, but I am not ready to handle 8,000,000 volts of electricity. Currents of such strength would kill everybody in the room. I expect, however, to learn how to control a large voltage. When I have increased the atmospheric vibrations, perhaps a thousand times, the phenomena will be no longer electricity. It will be light. I am satisfied that sunlight can be made from electricity without doing harm to anybody, and I expect to discover how it is done."

Oil vs. Electricity.

It is stated that in foggy weather the electric light is not nearly so effective as a lighthouse illuminant as gas or oil. The commissioners of Irish lights are seeking the statutory sanction of the Board of Trade for the adoption of the electric light as a fixed light at the Old Head of Kinsale, says *Invention*. Local feeling, however, is opposed to the proposal, and a quantity of evidence has been obtained, chiefly from shipmasters, including Captain J. T. Bragg, adviser to the Liverpool Steamship Owners' Association, all of which, we are informed, condemns the electric light as of little or no use under hazy conditions of the weather. The most powerful light of the kind is that of St. Catherine's Point, Isle of Wight, and the stranding of the Eider well within the zone of this light is regarded as a lamentable proof of its efficiency in fog.

A New Mining Lamp.

A newly-invented electric mining lamp is called the Sussman lamp for its battery. The affair is 2¾ inches square by eight inches high, and weighs less than four pounds. One charging of the battery assures a clear and brilliant light for 14 or 15 hours. The cost of maintaining the lamp does not exceed that of a kerosene lamp. The battery is of the dry type, and thus there are no fluids to overflow and destroy the connections, as is sometimes the case with portable electric lamps.

To Measure Lightning.

A novel apparatus has been devised by Messrs. Siemens & Halske for registering the number of times that lightning has passed through a circuit. It consists of an iron bar placed near but slightly oblique to the line, and pivoted like a compass needle, so as to allow it to turn through a small angle; an abnormal current in the wire will tend to place this iron bar perpendicular to the wire; this motion is limited to a small amount by two stops, and, by means of a pawl and rachet, operates an indicator hand, which, for each motion of the bar, advances one mark on a circular dial. The iron bar returns to its original position on the cessation of the abnormal current.

Too Loud a "Ticker."

It was recently reported in the London *Daily Telegraph* that the parish church at Chesterfield has a telephone with 40 or 50 subscribers. The pulpit transmitter was at one time placed underneath a cushion covering the stone top, a circular piece being cut out of the cushion for the purpose. A strange preacher, not being aware of its existence, put his watch in the circular aperture, thinking it to be a receptacle designed for such use. Next day persons who listened to him through the telephone said they had heard him very well, but thought he must have been wearing a very loud "ticker," as it made quite as much sound as he did himself.

It Helps Germination.

Prof. R. Chodat describes an investigation into the action of electric light on vegetation, in which he demonstrated that electric illumination exercises a favorable influence on the germination of seeds. He confirms G. Bonnier's statements that the effect of this kind of light on herbaceous plants promotes the lengthening of the stems and leaves. Under glass the light greatly accelerates growth and causes the green parts of the plants to assume a more intensely green tint. The structure is at first strongly differentiated, but prolonged exposure acts in this direction with a deleterious effect.

A New Look.

A novel electric lock has been invented especially for use on windows, which, by means of this device, may be left open one or two inches for ventilation, and be quite as secure as when completely closed. The lock operates with ease by simply pressing a button, and can readily be connected with the fire or police alarm service, so that any unwarranted tampering with the window or mechanism will be immediately followed by a report at the fire or police station.

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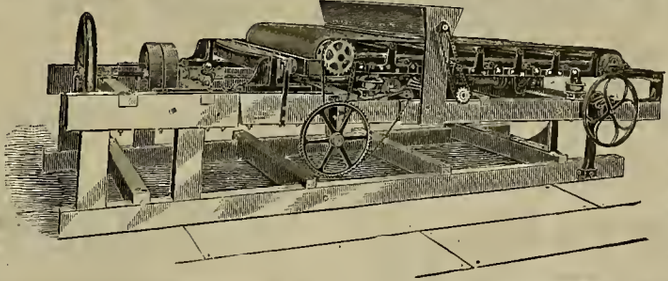

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Coast Industrial Notes.

—Cove, Or., is shipping quantities of apples East.

—The Pacific Union Club, San Francisco, may erect a new building to cost $300,000.

—Judge Fulleton of the Oregon Circuit Court has set aside the recent sale of the Oregon Pacific.

—The San Francisco Bridge Company of this city has assigned, with liabilities of $200,000; assets, $500,000.

—Seamen for coasting vessels in the coal trade must be content with $25 a month. The cut was announced last week.

—All efforts to save the steamer City of New York, wrecked off San Francisco harbor, have been abandoned.

—The Southern Pacific Railroad Company is shipping from about Castle Crags a rock that forms a fine cement pavement. Carloads are left daily at Lincoln.

—The steamer Leader, which collided with the steamer J. D. Peters about two weeks ago, has been raised successfully from the San Joaquin river, the barges Atlas and Victor being used as a pontoon.

—A number of new men have been put to work learning the trade of gripman within the past month on the Market street system, and not a few of the older hands have been dismissed for one cause or another.

—Wheat charters to Great Britain are quoted in Portland, Or., and Puget sound ports at 33s to 33s 9d., while here charters range 1os lower. The difference in the rates has led the owners of one or two idle vessels to charter up north and send the ships in ballast where they could load grain.

—Captain Cox of the Sealer's Association, who was recently in England, says the question now is as to how rigidly will the Paris regulations be enforced, as there is no movement to modify them. The prospects for the higher-priced skins is very blue indeed. Vessel owners, though fitting out, scarcely know what to do with their vessels.

—Mayor Ellert has filed a petition for an injunction against the Market-street Railway Company, operating the Mission-street line. The prayer of the complaint is based upon the knowledge that the defendant company is about to construct an overhead wire (trolley) system for the purpose of operating the Mission-street line.

—Since Rogue river, in Oregon, has regained its normal stage of water, a deep channel is being cut straight out to sea, while the north spit has moved out to sea fully half a mile. At low tide a low spit can be seen reaching out from the McCormack rock in a semicircle to the mouth of the river, half a mile farther out than the former spit, and where the mouth of the river formerly was is now dead water.

—McPhee & Grallere were lowest among the list of bids opened recently by the supervising architect at the Treasurer's office for constructing the mail platform, inclosure and approaches to the new postoffice building at Sacramento. Their bid was $3974. The other bids were: Kreusberger & Harvie, Sacramento, $4363; Silas Carle, Sacramento, $5079; Carlin Bros., Sacramento, $4078; McKay & McCann, San Francisco, $5240.

—The trustees of the Whittier State School recently opened bids for the construction of two buildings for the girls' department. There were 36 bids. Stephens & Myers were awarded the contract for plumbing and steam heating; Mackay & Young, the contract for carpentering, plastering, iron and brick work; The Globe Cornice Works, galvanized-iron work; E. E. Peck, electric work; Stumpf & Spence, painting. It is expected that the buildings will be completed June 1st.

—On January 1st a new schedule of wages will go into effect in the Mare Island Navy Yard. The Board of Wages, after investigating the wages paid in San Francisco, prepared a new schedule which involves a big cut. The recommendations of the board were sent to Washington, and a telegram received to-day announces that Secretary Herbert will approve the board's action. The decrease amounts to from 24 to 56 cents per day. Laborers are not affected. In a few instances there will be a slight increase, but every man that is a mechanic will get less pay.

—A very important suit has been commenced in the United States Court at Los Angeles by the Crystal Springs Water Company against the city of Los Angeles. This will settle the question as to whether the city owns the water in the Los Angeles river or whether the company does, and includes as well the point as to the ownership of water which percolates through the bed of a river and is drawn off by means of wells sunk below the bottom of the river but at some distance from it. On the outcome of the case depends the possibility of the city constructing and owning its own water works.

—Recently good news was brought to town by Sam Todd and Tom Wood, says the Alturas *Herald*. While out prospecting about two miles this side of Cedarville, in Cedar pass, they discovered a six-inch vein of coal that could be traced some distance. Samples of the coal were tested by George Armstrong, the blacksmith, and were pronounced by him as being of excellent quality. It burned just the same in the forge as the coal he uses from the city, and he had no trouble in obtaining enough heat from it to weld iron. The discoverers have filed their location papers and will return in a few days and prospect the vein to find out if it increases in size and quality as depth is reached.

—The Southern Pacific earnings for 1893 will make a gratifying showing. In 1892 the gross earnings amounted to $48,972,000 and the operating expenses were $31,288,000, giving the net result of $17,684,000 to the good. The operating expenses for this year will aggregate about the same as last year, and though the officers of the company admit that they look for a slight decrease in the net earnings they think the falling off this year will be very slight. The difference will certainly be smaller proportionately than was shown at the end of October in this year, for the reason that the November and December receipts were much in excess of the receipts of those months last year.

—The State Treasury is rapidly being filled with gold received from the counties of the State on account of the first installment of taxes. The counties that have settled so far, together with the amounts, are as follows:

Placer	$40,388 11	Yolo	$83,019 02
Tehama	43,336 12	Plumas	9,674 50
Solano	89 678 29	Lake	18,377 00
Napa	63 450 01	Humboldt	78,019 55
Orange	38,301 26	Siskiyou	27,104 38
Glenn	44,515 04	Trinity	5,674 60
El Dorado	17,849 55	Tuolumne	13,779 40
Madera	20,646 38		
Nevada	14 083 15	Total	$607,596 36

—Fire in "Printer's Row," San Francisco, Monday, Dec. 25th, caused the following losses:

Francis, Valentine & Co.	$100,000
E. J. Shattuck & Co.	10,000
E. W. Goggin	4,000
Commercial Steam Power Company	5,000
Blake, Moffatt & Towne	20,000
Edward Bosqui	45 000
Paul Brunotte	500
Mysell & Rollins	1,000
Losses on buildings	30,000
Losses on cuts, papers, etc., in Francis, Valentine & Co's	10,000
Call and Bulletin	5,000
Total	$230,500

All are covered by insurance except Francis, Valentine & Co., who have $22,000.

—The first circular giving information touching the Southern Pacific Company's new freight tariff has been issued, showing a marked reduction in the rates to be charged to shippers in this State and on this coast after the first of next month. The circular just issued covers only a limited ground, being selections from a list of some hundred grocery articles, drawn up by the Southern Pacific Company, showing the difference in rates between the present tariff and the new, from San Francisco and Sacramento to Fresno, Bakersfield, Maricopa and points in Arizona on the Southern Pacific main line; to Chico, Tehama, Red Bluff, Redding, Delta, Sissons, Montague, etc., on the Oregon main line; and Auburn, Reno, Winnemucca, etc., on the Central main line. In many instances the rates show a reduction of from 20 to 33⅓ per cent and as low as 50 per cent, but the average will be about 10 per cent.

—The California and Nevada Southern railroad will reach Iron county in southern Utah in four and one-half or five months. The line is being pushed right along. It will connect with the Rio Grande Western at Provo. This line will give Utah a direct route to southern California, and by next July it is expected that a through train will be run between Ogden and Los Angeles. The new line starts from a point 100 miles north of Goff, Cal., on the Atlantic and Pacific, and extends through southern Nevada to Iron county, Utah, where the company owns coal and iron properties, there to connect with an extended line from the Rio Grande Western. There is unlimited capital behind this road, and the track will be constructed so as to make it a fast and safe line. The grade will not exceed 1½ per cent anywhere, notwithstanding the rough country through which it passes. Already $600,000 has been expended for engineering work alone.

Mining Summary.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

THE IVANHOE.—Plymouth cor. *Dispatch*, Dec. 21: The above-mentioned mine is owned and operated by a company of four young men, born and raised in this immediate vicinity. Any one visiting the Ivanhoe mine to-day will find there a shaft down 100 feet, with a tonnel or drift on the 90-foot level running north on the ledge 20 feet and another running south on the ledge 25 feet, and a steem engine of a 12-horse power capacity, used for hoisting. A well-equipped blacksmith shop and a five-stamp mill, run by water power.

The ore pays $4.50 in free gold milling test, the sulphurets assay $50 per ton, with an eight-foot ledge in the bottom of the shaft and a ten-foot ledge in each tunnel or drift. The present owners of this fine piece of mining property will continue to sink 100 feet deeper on the beginning of the new year. At present they are working, taking out and milling $4.50 rock from the tunnel above mentioned, more for the purpose of prospecting the ledge than otherwise, and being satisfied and convinced that they have a mine, hence sinking another 100 feet will be the next move, after which they again intend to drift both north and south on the ledge. The rock in the shaft at present is $4.50, the same as in the drifts.

Superintendent Jones informs your reporter that the "bolkhead" in the Bay State tunnel is completed, and that sinking will commence on the 20th inst., and will be pushed along as speedily as possible.

AT THE FARRELL.—Amador *Ledger*, Dec. 23: The improvements at the Farrell mine have grown till the bank of the river at that point is dotted with new buildings, including a mill, an office, a boarding-house, sleeping apartments and all the necessary constructions connected with a well-appointed mine. The work is in charge of R. Wise, one of the chief owners of the property. The mill was started Wednesday upon heavily sulphuretted rock, which assayed $10 per ton. The development of this mine has proved beyond a preadventure of a doubt that it is located on the Gwinn mine ledge. Many good miners who worked in that property say the formations are precisely alike and that the ore is identical in character. During the prospecting work that has been done since the present people have had charge of the property, an abundance of rock has been uncovered, ample being now in sight to run the mill for many months. They get their power from the Blue Lakes ditch, which carries water to the hill above their mill, the fall being ample for all purposes.

Butte.

AT FORRESTOWN.—*New Era*: A. B. Birmingham and Max Bills are developing a quartz ledge near Lumpkin. They have a four-foot ledge which prospects well in both free gold and sulphurets, and it is reported that a ten-stamp mill will be erected on the mine in the spring.

L. C. Jacobs, of Oroville, and Morris Laughton, of Lumpkin, are also doing considerable work upon a recently discovered ledge near the Birmingham & Bills' mine, with equally as good prospects. In years past several arrastras have been built and operated upon ledges in this vicinity, and considerable gold obtained, but the process of working was too slow, as well as not favorable to the saving of the gold and the method has been abandoned; but it is believed that, with stamps and improved machinery, several of the ledges already uncovered will pay well.

L. L. Myers, superintendent of the Spring Valley Gold Co., of Cherokee, in company with others, is at work upon a quartz ledge on the east side of the Middle Fork of Feather river, near the old Meachum mine. This ledge is supposed to be an extension of the Crystal Hill mine, and is about four feet wide. The parties having the work done are men of capital, and it is reported that they are well pleased with the prospects so far obtained. The Crystal Hill mine had a mill upon it away back in the '50's, and considerable gold was obtained from a short run; but, like most of the early quartz mining, more gold was lost than saved. The mill was moved away and the mine abandoned. It is said that parties afterward cleaned up over $700 in amalgam just below where the tailings from the mill were dumped.

Morse & Co., who have been running a tunnel to strike a quartz ledge on New York Flat for some time past, have finally got through and struck the ledge, which is well defined and prospects well. The tunnel is over 250 feet long and is substantially built. It is quite probable that a mill will be built upon the ledge at no distant day. Rock taken out of the tunnel shows as good ore as any in the district. The owners have labored long and hard and spent much money in running the tunnel, and everybody unites in the wish that they have struck a bonanza. The mine is situated about 1½ miles from Forbestown, on New York Flat, a flat very rich in placer mines in days gone by.

The Denver mill, near Forbestown, is ready to commence crushing ore and only awaits the completion of the ditch, which is to furnish the power, to start up.

Work upon the Bullion mill, about a mile west of Forbestown, is being pushed forward with all possible speed, but the bad weather and roads are making it slow at the best, and it will be a month before the mill is completed.

W. A. Williams, superintendent of the Burlington mine, has a force of men driving a tunnel to tap the ledge at a low level. This mine is situated within half a mile of the business portion of Forbestown.

Inyo.

GOOD STRIKE.—*Register*: A good strike is reported from the Georgia mine in Redding canyon. An 18-inch ledge of good gold ore is in sight.

Nevada.

THE CALIFORNIA.—*Telegraph*: The California mine, now called the Gaston Ridge, is being actively prospected. The mine is near Eureka South, and is the one which Patrick Foley used to superintend. Just now there is very heavy machinery being shipped to the mine, and that machinery will soon be in operation. Twenty stamps will be grinding out quartz from the mine in a short time. Mr. Eddridge Newton is the superintendent of the mine. He has been mining in Siberia and in North China, and is thoroughly acquainted with all the details of mining.

THE PENNSYLVANIA.—*Tidings*: Superintendent Eddie reports everything looking first-class at the Pennsylvania mine. The ledge in the bottom of the shaft looks well and the drifts are being steadily driven ahead.

A GOOD MINE.—*Herald*: The West Harmony gravel mine is turning out some fine quartz boulders, which are found in the gravel, and which are rich in free gold. Superintendent McCall has saved a number of pieces which show bright leaf gold, in fantastic shapes, and will send them to the Midwinter Fair.

MINE TO BE SOLD.—*Transcript*, Dec. 22: For some time past negotiations have been going on for the purchase of the Murchie Mining Company's property, about two miles from Nevada City, and it is said, upon good authority, that within a week or ten days the sale will be made. The parties who are to purchase the property are all wealthy Germans of San Francisco, and after as good an examination as could be made they were satisfied with the property and the price and agreed to take it. As soon as they get the property they propose to work it on a very extensive scale, and will erect a larger stemp mill than there is in the county at the present time. That means employment for a hundred or more men as soon as they can get the mine in a condition to do so. The mine consists of about 400 acres of patented ground, and there is a complete network of quartz ledges running through the whole property. Those who know say there are thousands of tons of low-grade ore in one of the mines alone, and this the new company proposes to work.

J. V. Brooks, who recently purchased the Turner mine at Hunt's Hill, ordered Friday from the East one of Bennett's amalgamating machines, to be shipped immediately. Mr. Brooks expects to receive it here within 90 days. It will be the largest machine of the kind on the coast.

H. W. Morris, principal owner of the Boss mine, near Sweetland, was in town Friday. He reports everything looking well at the mine, the developments thus far exceeding the company's most sanguine expectations. Work is progressing nicely. Mr. Morris went to San Francisco on Friday. While below he will order six more Huntington mills sent to the mine. When these are ready to run the number of employes will be increased.

Thomas Fairweather, who has been for some time past working the White Diamond mine, which is situated above the Derbec mine, in Bloomfield township, struck very rich quartz the other day. He has a shaft down 75 feet on the ledge.

Jay Ostrom of Bloomfield was in town on Friday. He has for some time been working a gravel mine near that place and has lately struck rich gravel containing coerse gold. One piece was found that was worth $4.80.

The Derbec drift gravel mine is looking better than for a long time. Twenty-five men are employed on day shift, and they are taking out fine gravel.

ANOTHER MINE SOLD.—*Transcript*: J. V. Brooks, the mining man from Louisville, Kentucky, who has been in this county for the past two weeks looking for a mine for Eastern capitalists, has purchased the Mistletoe mine at Rough and Ready. It is said to be a good mine and will be worked on an extensive scale.

BOUGHT A NEW PUMP.—*Transcript*: Of late the volume of water in the San Jose gravel mine has increased so rapidly that it became impossible to handle it successfully with the pump used. A larger pump has been purchased and will be taken to the mine and set to work without delay. The gravel that is being taken out is quite rich.

ELECTRIC LIGHTS FOR THE CHAMPION.—*Transcript*, Dec. 21: Supt. Zeitler informs us that the dynamo ordered for the Champion mine was expected here to-day. The work of setting it in place and running the wires will be commenced without delay, and, if nothing happens, the mine, mill, hoisting works and chlorination works will be lighted with electricity by the 1st of January. The incandescent lamps will be of 80-candle power, and will be used under and above ground.

Placer.

THIRTY-FIVE MEN WORKING.—Colfax *Sentinel*, Dec. 23: Up near Cape Horn the South Yuba Canal Company has about 35 men at work digging the ditch and clearing brush. The men were making rapid progress until yesterday, when they were forced to suspend work on account of the rain.

PROSPECTS WELL.—Colfax *Sentinel*: The Willis Gould mine, situated on the ridge about three miles above the Morning Star mine, is rapidly developing into a good mine. Mr. Gould has been working this mine alone for several years past and some time ago broke through into the main channel of the divide, and found a bed of pay gravel some 60 feet

wide, which pays from $5 to $11 a carload. Lest week he bronght $150 to Iowa Hill in nice smooth gold, and Sunday he brought in a nugget that weighed $22. There is a fine chance for some person who has the meens to rnn ahont 500 feet of bedrock tunnel to meke a good investment.

FAVORABLY IMPRESSED.—Colfax *Sentinel*: Two expert miners named W. H. Ronse of Oekland and W. B. Stanley of Virginia City were in Colfax last week on mining bnsiness. They investigated the large ledge on Gillis Hill, about two miles below here. The ledge is an extensive one, being some 20 feet between the walls, and shows well in free gold. The property is well located and affords an excellent opportunity for tapping the ledge at a good depth by the tunnel process. The gentlemen were very favorably impressed with the prospect.

Shasta.

SHASTA COAL.—Redding *Free Press*, Dec. 23: Jay Conklin, the veteren coal miner, who for ten years pest hes been trying to develop the coal deposits lying in the Ronnd Mountain district, about 25 miles from Redding, says that the coal of Round mountain is not excelled for heating purposes hy that eold in the San Francisco market; hut he realizes that the distance from market makes it at present of little valne. Perhaps, with river transportation, Shasta county coal will become valuable. If Mr. Enright extends his road, the coal conld be sent to the river at a trifling expense and loaded on barges.

GOOD PROPERTY.—Redding *Free Press*: Since the Iler brothers returned from Galt, they have been faithfully at work on their mine near Slick rock, ahove Flat creek. They fonnd a 40-foot cave in the tunnel, which they cleared away, putting in new timhers. There is no question regarding the valne of their property, which inclndes six good locations. The main tnnnel, which is 300 feet long, is the key to quite a number of ledges. From the mouth of the tnnnel to the top of the mountain it is 300 feet. The boys will force the tunnel throngh the hill, a distance of 200 feet farther. This will open up a vast hody of ore which is ahont the same grade and quality as the ore fonnd in the Uncle Sam, in the same range.

In the winter of 1889, M. Chapman, while crossing the mountains into the Happy Camp section, discovered some fine qnartz, showing free gold. Ae the snow was very deep, he postponed looking for the ledge nntil the following summer, when, accompanied by three others, he spent three weeks searching for it, but conld find neither the ledge nor the place where he had picked np the specimens. Each snceeding snmmer he renewed the qnest, with no better snccess. A few days ago, however, he received a letter from his pertner, a Mr. Johnson, saying that he had fonnd the ledge and thet it is very rich. In the first specimens found the gold was eesily visible to the naked eye, and the discoverers no donbt have a paying property.

NEVADA.

White Horse District.

ON A NEW LONE.—A representetive of the Wadsworth *Dispatch* has an interesting acconnt of that new mining district. He says:

Striking ont with one of Crosby's livery teems toward the range of monntains about five or six miles northwest of Wadsworth, after a pleasent drive of an honr the writer ceme to the foot of the White Horse canyon, where is located the Addie C. claim, at which he fonnd a sheft. It is being worked by Mexicans sent from Sen Jose by capitalists. The sheft was 35 feet deep and drifts were running eest and west in search of a prospect. The resnlt was the finding of a three-foot ledge of gold rock. Nnmerons semples have been sent to San Jose, and the returns must have heen satisfactory enongh to keep the three men delving.

The next prominent cleim was the Eest Jim Blaine, upon which some prospecting has been done. However, as this claim joins the Jim Blaine, it was considered valuable enough by its owners to be offered under a bond of a year's time for $25,000. These figures were given in compliance to a request made hy an expert who visited the district in the interest of San Francisco capitalists. The Pay Car claim was, nnder the same conditions, placed at $15,000. These claims are not developed, and the croppings only prospected and assayed.

The Jim Blaine mine, owned by Ned Gregory, and being worked under bond by Sacramento psople, is the farthest of the claims in the district and the canse of the excitement at White Horse. A dozen assays taken from this mine range from $30 per ton npward in gold, and attracted attention to the district. The Jim Blaine shaft is down 93 feet, and when it is 100 feet deep, by the terms of the bond, crosscntting will commence and the width of the ledge will be determined. Regardless of the width of the ledge there is ore enongh in sight to pay donble the amonnt for which the mine is bonded.

At White Horse City we fonnd a typical young mining camp of four houses and lumber for more. It is known as the Coal Camp from the fact that a small seam of first-class coal was found at the point some 17 years ago, hut after sinking some $5000 the finders abandoned the coal mine.

Tonching White Horse City is the Emma L. mine, owned hy the Wæsheim brothers. Here is a two-foot ledge with some very rich gold rock in it. This claim promises to pay big from the surface, and some of the specimens taken from this ledge would ornament any cabinet. This claim is held at $50,000, the owners offering to hond for that amount. The claim is covered with rich streaks, as indicated by the croppings, and if they come together, look ont for a famous mine. Jnst over the hill are the Tigers, Black Point and Bi-Metallic, which are held in pool for hond at $30,000.

The Washoe Company is running a tunnel, and hope to realize sanguine expectations in about six weeks. They have very rich croppings, and will strike the ledge 200 feet from the snrface when the tunnel is 150 feet. Miners at the Royal are tunneling for the main ledge, which they expect to reech very soon; in the meantime they are enconntering pay rock right along, but are anxious to see what it looks like "in there."

The North Broncho is econnted a "sure thing," with a good ledge cropping ont at the lowest point in the gully. The claim is between the Royal and the Washoe Company's Sunset. Then there is the Manhattan, and Andy swears by it, end the indications are first-class. We have confidence in the good angel.

There are a number of claims in the district owned hy parties at Reno and Wadsworth. The croppings all prospect, and as soon es a little work is done the owners will know e little more abont them.

BRITISH COLUMBIA.

IN THE SLOCAN.—Nelson *Tribune*, Dec. 14: Every available team is now engaged in hanling ore from the mines in Slocan district, and by New Yeers the ontpnt landed at the wharf at Kaslo, or at the ore-sheds at Three Forks, will aggregate 30 tons a day. There are now 23 regnlar freight teams on the road between Three Forks and Kaslo. George W. Hnghes is hauling the output of the Idaho, the Monntein Chief end the Noble Five gronp. He is also making a trail to the Snrprise, the claim thet was purchased last week by E. W. Ferguson of Chicago for $60,000, helf spot cesh. There are over 150 tons of ore sacked at the Snrprise, and Hughes hes the contrect to haul it to Keelo. Snrprise is adjacent to the Noble Five gronp, and was located in Jnly, 1892. A man named Jennings end Thomes McGnigan were the owners. Hugh Mann has a contract for hanling 500 tons, and as mnch more as he can haul, from the Slocan Star to the ore-shed at Three Forks. Gilliam & Pound are raw-hiding ore from the Washington to the road, where it is forwarded to Kaslo by a teemster named Mitchell.

The following mines are being worked: Freddie Lee, Slocan Star, Enreka, Noonday, Rico, Surprise, Washington, Bonanza King, World's Fair, Sepphire, Alamo, Idaho, Mountain Chief, Dardanelles and Northern Belle. Work was suspended on the Wellington this week, Snperintendent Watts and Foreman Robb both leaving for the East. Tenders ere being asked for a 200-foot tunnel on the Alpha, one of the Grady gronp. Everything considered, the ontlook is good for a large output of ore from Slocan mines this season.

A STRIKE AT AINEWORTH.—Nelson *Miner*, Dec. 16: News of a new aod valuable strike has been received from Ainsworth. Last week while the men were engaged in rnnning a joint tnnnel on the boundary line between the Black Diamond and the Little Phill, they suddenly broke into a strong vein of gelene. When enough had been done to size np the new and it proved to be 8½ feet of clean galena ore that will run 80 or 90 onnces in silver and about 75 per cent lead.

The Black Diamond is owned by J. Stevens, chief engineer of the Great Northern, and the Little Phill is the property of Tom McGovern and Capt. Heyword.

OREGON.

THE SIMMONS' DAM.—Rogue River *Courier*: Tbe carrying away of the Simmons' dam is bad for the Waldo conntry, as it throws a nnmber of men ont of employment and forces the owners to discontinue piping for the seeson. This rich placer annnelly distribntes thonsands of dollars in the southern end of this connty, besides netting a handsome cleannp for its owners. The valne of the dem was probably ahont $500, hut its loss is small compared to loss of the seeson's run.

MONTANA.

TO DRIVE A LONG TUNNEL.—Bntte *Inter-Mountain*: When President McLure of the Granite Monntain Mining Company was in this city a few days ago, he divulged some interesting news which may be considered perfectly reliable. The directors of the Granite and Bi-Metallic companies were in Philipsburg and vicinity dnring the past two weeks and mnch anxiety was felt in that neighborhood over what the visit of the mining men might mean.

The Granite Mountain and Bi-Metallic companies will, jointly, drive a tunnel one and one-half miles long. This will tap the Granite vein at a depth of 1400 feet and the Bi-Metallic vein at abont 1100 feet. The estimated cost of this work will be between $350,000 and $400,000. It is expected to have the big bore through in 18 months. This will be fast time, hut work will be carried on through more than one opening. Levels will be run from the present workiogs of the two mines and the shafts will be developed to the same depth as the tunnel.

The main pnrpose in doing this work at this time, Mr. McLure says, is to give employment to men. Under the contemplated programme of work it is thought from 200 to 300 men can be utilized, as work will be going on in several portions of the two mines at once. The surveys for the work have been already completed. All this new work is to be let out by contract, and it is the intention to have it in progress on or about the first day of January. All work will be paid for in silver coin. It is a fact nowadays that the Granite people will not pay for anything in other than silver coin.

It is proposed by this tunnel to keep the properties drained of water and to lessen the expense of pnmping. It is expected, however, by the time the long tunnel is completed silver will have received more favorable recognition.

Another new enterprise decided npon is the building of a suitable mill for working the tailings on hand. It is estimated the Granite company has about 200,000 tons of tailings. The tailings mill is to be huilt very soon.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING DECEMBER 12, 1893.

510,668.—SELF-LAYING TRACK—A. P. Andereon, Oriental, Nev.
510,674.—DUMPING CAR—D. P. Cameron, S. F.
510,675.—SAFETY GUARD FOR CARS—L. P. Clarke, Alameda, Cal.
510,409.—TYPEWRITER—W. S. Cress, Portla d, Ogn.
510,592.—TURN-TABLE—E. W. Edwards, S. F.
510,593.—SIGNAL FOR CABLE ROADS—E. W. Edwards, S. F.
510,594.—AIR BRAKE—J. Erdody, S. F.
510,770.—LUBRICATOR—L. Fawcett, Eureka, Cal.
510,633.—ELEVATOR—H. B. Gale, S. F.
510 786.—FURNACE DOOR—E. W. Harris, Palisade, Nev.
510,802.—GATE—J. E. Knapp, Browneville, Ogn.
510,810.—TABLET—A. Marks, S. F.
510,647.—CONDUIT—J. P. Micbieti, S. F.
510,649.—CLOSET TANKS—C. Otterebagen, Portland, Ogn.
510,521.—PIPE ORDAN—F. F. Sboenstein, S. F
510,824.—BUCKLE—P. B. Southworth, Marysville, Cal.
510,622.—CASH REGISTER—E. T. Taylor, Oakland, Cal.
510,454.—BAR ROUNDING MACHINE—Wagner & Beaurgard, S. F.
22,964.—BADGE DESIGN—J. L. Sale, S. F.

FOR THE WEEK ENDING DEC. 19, 1893.

510,679—GAS ENGINE—Barrett & Daly, S. F.
511,109—HAY-LOADER—F. M. Bird, Wenatchee, Wash.
511,117—CAR COUPLING—S. C. Broun, Niagara, Or.
511,075—HYDRAULIC TIME APPARATUS—J. F. Franke, Santa Ana, Cal.
511,298—BRAKE SHOE—J. T. Hall, S. F.
511,149—FILTER—C. K. Lamb, S F.
510,919—TOY—J. D. Latimer, S F.
511,243—SELF BINDER—J. M. Laurence, Mew Whatcom, Wash.
511,052—LAMP DRAFT REGULATOR—J. W. Lawson, San Bernardino, Cal.
511,064—LAMP-FILLER—J. W. Lord, Cucamonga, Cal.
511,304—PAVING BLOCK—E. T. Mapl, Antioch, Cal.
511,244—TELEGRAPH RELAY—F. P. Medina, S. F.
511,057—TOOL-HOLDER—F. Obiols, Ventura, Cal
511,249—HOLLOW TILE, ETC.—C. P. Oudin, Spokane, Wash.
510,990—STAMP-STEM GUIDE—T. Pilkington, S. F.
510,936—CATAPULT—C. W Renear, Stockton, Cal.
511,254—ELECTRIC RAILWAY W. S. Smith Berkeley, Cal.
510,944—STRINGING PIANOS—C. S. Weber, San Jose, Cal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notioes of Reoent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

WATER FILTER.—C. K. Lamb, S. F., Cal. No. 511,149. Dated Dec. 19, 1893. This invention relates to certain improvements in water filters, preferably adapted to be attached directly to the discharge pipe through which water is conducted. It consists of a case having a hermetically closed removable top and a conical or funnel-shaped bottom, with a peculiar valve or cock by which the direction of water from the inlet pipe may be changed or cut off at will, so that water may either be drawn directly from the cock through a pipe extending below the bottom of the filter, or directed up through the filter and drawn through a discharge pipe leading from the upper part of the filter, or, lastly, from the chamber beneath the filter, so as to wash out any collecting sediment. The filtering material rests upon a perforated filter bottom, and above it is an inclined perforated filter plate through which the water passes to the upper chamber after having been filtered. Whenever the cock is turned so as to admit water into the filter, the direct discharge passage is cut off and water passes up through the filter and thence through the discharge pipe at the top. When the cock is turned to cut off the supply of water, that which remains in the conical chamber beneath the bottom filter plate is free to escape through the bottom discharge passage, and the sediment is thus washed out every time the filter is used.

RAILWAY RAIL JOINT.—Leonard W. Kennedy, Oakland, Cal. No. 510,268. Dated Dec. 5, 1893. This invention relates to an improved joint for railways. Difficulty is experienced in making suitable joints between the meeting ends of railway rails; on account of the constant pounding and variation of weight when heavily loaded trains pass over such joints they are continually rising and falling with reference to each other, and the passage of the wheels over these unequally supported ends causes a constant hammering which soon spreads and batters the rail. This invention contemplates the interposition of an anvil block or support which extends between the meeting ends of the rails and serves as a tie or support thereof. These anvils are made in various forms and interposed either by cutting away the lower flange and part of the web of the rail and allowing the head and upper portion of the two rails to abut over this anvil, or by cutting out also a portion of the head of the rail and extending a correspondingly shaped section of the anvil up between the meeting ends of the rails. This extended portion may be essentially rectangular in its horizontal section or it may have vertical channels of a V-shape, and the ends of the rails correspondingly shaped to fit. Suitably shaped fish-plates extend upon either side of these supports and along the webs of the abutting rails to which they are secured. In some cases the support block has transverse extensions which slope downwardly each way from the rails and are bolted upon the ties or other supports, the rails abutting against these supports as previously described. If preferred, the anvil block may be rolled with the fish-plate upon one side, forming a part of it, and this will be bolted to the abutting rails, while the separate fish-plate will be bolted upon the opposite side in the usual manner. This device reinforces and strengthens the rail joints, makes them smooth by dividing the spaces allowed for expansion, and the solid interposed anvil base receives the principal force of the blow of the wheels, thus protecting the ends of the rails and preventing their brooming; and it also eliminates the hinge motion of the present form of joints and prevents the blowing of dry dust or the pumping of the soft, wet material when the roadbed is wet, so that the track is preserved even and smooth and the cost of maintaining a roadbed and rolling stock is reduced.

SHAVING BRUSH.—Gilbert L. Belcher, Oakland, Cal. No. 510,152. The object of this invention is to provide what may be termed a fountain shaving brush. It consists of a brush having a hollow handle forming a reservoir which is filled with a soap paste of the proper character for shaving purposes. The end of this handle or reservoir is so formed as to receive the upper fixed ends of the bristles which form the brush and retain them permanently in place. The diaphragm or partition which separates the bottom of the chamber from the bristles is perforated, having an opening or tube leading from the chamber into the space between the bristles. The opposite end of the chamber is provided with the plunger which is movable by screwing or otherwise so as to force the paste through the opening and into and among the bristles. Any quantity may be thus forced into the bristles, and, by simply wetting the brush and passing it over the face, a suitable lather will be formed for shaving. This brush is very useful for travelers and others who wish to avoid the annoyance of separate soap boxes, hot-water cups, etc.

PICTURE BLOCK.—Oscer Waihel of S. F., Cel. No. 510,216. Dated Dec. 5, 1893. This invention consists of a nnmber of blocks nnited throngh diagonal plenes by a flexible connection, so thet the blocks may be turned into various positions with relation to eech other, to form figures and desigos of varied character. Tbere are several strings of these blocks end their snrfaces are so ornamented as to form perts of a complete design, reached only by long stndy and careful manipulation in tnrning all the blocks and uniting the several strings.

Board Sales of Mining Stocks.

S. F. Stock Board.

THURSDAY, December 28, 1893.

9:30 A. M. SESSION.

750 Andes	.60c	120 G & C	.75
100 Belcher	.8°c	50 H & N	.60c
150 B & B	.1.90	100 Julia	.5c
100 Oon. Cal. & Va	.2.95	100 Potosi	.70c
100 Confidence	.1.10	100 Sierra Nevada	.1.05

2:30 P. M. SESSION.

100 Ophir	.1.35	100 Belcher	.85c
100 Mexican	.75c	100 Confidence	.1.00
760 Con. Cal. & Va	.3.15	200 Sierra Nev	.1.10
50	.3.20	300 Overman	.35c
50 Crown Point	.40c	100 Union	.75c
200	.45c	50	.80c
200 Best & Belcher	.1.95	50 Caledonia	.10c
100 Yellow Jacket	.1 00	300 Andes	.65c
00	.1.05	100 Occidental	.10c

Justinian Caire.

One of the names familiar to tbe mining regions of tbis coast is that of Justinian Caire, agent of the San Francisco Novelty and Plating Works, wbo, as a provider of mining and milling supplies of all descriptions, has made his large establishment in this city useful to all engaged in quartz, gravel and placer mining; and he makes it his special busioess to see that each appliance is of the best, most durable and most efficient in use. One specialty is the silver-plated amalgamating plates, which have stood the test of long use and which are in high favor among millmen. Each plate is guaranteed to have full weigbt of silver and to be of the best quality of workmanship. The best soft Lake Superior copper is used.

The list of assayers and chemists' supplies is very complete. He furnishes, among other things, a $90 outfit for assayers and prospectors, which comprises all apparatus and chemicals necssary to fit up a small establishment. This outfit enables many a miner and prospector, with a little experience, to do much of his own assaying, especially in remote places where access to competent persons is difficult. The list of drawing instruments is large and varied. Text books on chemical and metallurgical subjects at all likely to be in demand are kept in stock. Chemicals and compounds for assayer's use, reducing ores, etc., are on hand in packages of convenient size, many in ounce bottles, chemically pure for tests. Commercial acids, bone ash, blue stone, copperas, and many other supplies, are made by Mr. Caire. A specialty is made of cyanide of potash. One other thing to which the attention of the public should be directed is the wire cloth and screens and other wire goods made by the Excelsior Wire Works. Customers are supplied with whatever style and mesh of cloth is desired, whether of brass, copper, iron or steel. The firm also makes it its invariable policy to give the public the benefit of any change in quotations on chemicals or other articles kept in stock.

DIVIDEND NOTICE

THE GERMAN SAVINGS AND LOAN SOCIETY,

526 CALIFORNIA STREET.

For the half year ending December 31st, 1893, a dividend hee been declared at the rate of five and one-tenth (5 1-10) per cent per annum on term deposits, and four and one-quarter (4¼) per cent per annum on ordinary deposits, payable on and after Tuesday, January 2d, 1894. GEO. TOURNY, Secretary

Market Reports.

The Markets.

SAN FRANCISCO, Dec. 28, 1893.

Silver has shown improvement in London during the week, but has, on the contrary, declined in New York. Congress is in recess, and no progress has been made toward silver legislation.

Change in Quicksilver.

For several days past some small lots of quicksilver have been pressing on the local market at prices considerably lower than the asking rates previously quoted. Holders of these parcels have shown particular anxiety to realize, and, as a consequence, the market is now in a very unsettled condition. Offers to sell at $35 per flask were promptly met by leading receivers at $34.50, as against $40.50 to $41 previously asked for home consumption. At present there is hardly any local demand, and export orders have been filled recently at a sweeping reduction. In the meantime the London market has undergone no change.

Silver and the Metals.

Copper has fluctuated, but closes the week in fairly good position. Lead shows no improvement in price, but the market is somewhat stronger.

NEW YORK, Dec. 28.—Following are the closing prices for the week:

	Silver in—				
	London.	N. Y.	Copper.	Lead.	Tin.
Thursday	32⅛	69⅛	10 37½	3 25	20 65
Friday	32⅛	69⅛	10 30	3 20	20 65
Saturday	32⅛	69⅛	10 30	3 25	20 65
Monday	....	....	.....	....	.....
Tuesday	32⅛	69⅛	10 25	3 20	20 65
Wednesday	32⅛	68⅛	10 25	3 20	20 65

San Francisco Metal and Coal Market.

ANTIMONY.		QUICKSILVER.	
Per lb	— @ 13	Home trade, pr. flask	37 50 @40 00
BORAX.		STEEL.	
Refined, in car lots	— @ 7½	English, lb	— @ 20
Powdered, do	— @ 7½	Canton tool	— @ 8½
Concentrat'd, do	— @ 7½	Bl'k Diam'd tool	8½@ 15
All grades jobbing at advance.		Pick & Hammer	6½@ 10
COPPER.		Machinery	4 @ 5
Bolt	23 @ —	Toe Calk	— @ 4½
Sheathing	23 @ —	PIG TIN.	
Ingot, jobbing	— @ 20	Spot ₱ lb	21½@ 22
Do, wholesale	15 @ 16	COAL.	
IRON.		SPOT FROM YARD—PER TON.	
Bar, base	— @ 2½	Wellington	$8 00
Norway, base	— @ 4½	Greta	7 50
PIG IRON.		Nanaimo	6 50
	Spot.	Cilman	6 00
Eglinton ₱ ton	18 00@—	Seattle	6 50
Glengarnock	18 50@—	Coos Bay	5 50
Am. Soft, No. 1	—@—	Cannel	9 00
Shotts No 1	19 50@—	Egg, hard	12 00
Puget Sound	—@—	Wallsend	7 25
Clay Lane White	19 00@—	Scotch Splint	8 00
Langloan	22 50@—	Brymbo	7 50
Gartsherrie	22 50@—	West Hartley	7 50
Barrow	22 50@—	TO LOAD—PER TON.	
Cargofleet	—@—	Australian	6 50@—
LEAD.		Liverpool Steam	6 87@—
Pig	— @ 4½	Scotch Splint	7 00@—
Bar	— @ 5	Cardiff	7 00@—
Sheet	— @ 6	Lehigh Lump	10 00@—
Pipe	— @ 5½	Cumberland	8 50@—
SHOT.		Egg, hard	9 00@—
Drop, sizes *smaller* than B, ₱ bag of 25 lbs	$1 75	West Hartley	7 50@—
Do do, B and *larger* sizes ₱ bag of 25 lbs	2 00	COKE.	
Buck, Balls and Chilled do, ₱ bag of 25 lbs	2 00	English, to load	$9 50@10 00
		Do, spot, in bulk	— —@12 00
		Oo, in sacks	— —@14 00
		Onmberland	9 50@—

Mining Share Market.

SAN FRANCISCO, Dec. 28, 1893.

The Comstock market has been neglected during the holidays. During last week the fluctuations were small, but gradually weakening. Tuesday, after the holiday, the market opened quietly. As a rule, however, prices were steady and a few stocks had a firmer tone. Yellow Jacket, in the Gold Hill group, and Andes at the north end of the list, had a sharp little advance. After the first session, Consolidated California and Virginia moved up to $2.95, and there was a better feeling. Then came a weaker range of prices.

Wednesday was another quiet day. The offerings of the Comstock shares were small, however, and with a few exceptions prices opened with a steadier tone, which developed into firmness as noon approached. Most of the trade was among the regular army of the street. Mining stocks are not the only branch of business which is quiet. At the banks and in commercial and general trade circles the dullness incidental to the holidays and other causes prevails.

Complimentary Samples.

Persons receiving this paper marked, are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, $3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS

ASSESSMENTS.

COMPANY AND LOCATION.	NO.	AMT.	LEVIED.	DELINQ'T AND SALE.	SECRETARY.
Alta S M Co, Nevada	44	10c	Nov 10,	Jan 4, Jan 28	J E Jacobus, 309 Montgomery
Chollar M Co, Nevada	37	10c	Dec 11,	Jan 15, Feb 6	Chas E Elliot, 309 Montgomery
Cons Wyoming C M Co, California	3	5c	Oct 3,	Jan 12, Feb 1	W J Garnett, 308 Pine
Crown Point G & S M Co, Nevada	63	25c	Dec 12,	Jan 16, Feb 6	Jas Newlands, Mills Building
Dora G M Co, Cal	2	5c	Dec 27,	Jan 27, Feb 27	Julius Blumenthal, 415 Montgomery
Eclipse M Co, Cal	6	2c	Dec 19,	Jan 20, Feb 8	Otto tum Suden, 316 Bush
Gover M Co, Cal	4	25c	Dec 26,	Feb 1, Feb 28	Robert McF. Doble, Mills Building
Inyo Marble Co, California	22	15c	Nov 10,	Dec 14, Jan 18	W W Sargeant, Mills Building
Jack Rabbit M & M Co, Cal	5	3c	Nov 1,	Jan 5, Jan 23	Chas Wetzel, 320 Sansome
Kentuck Con M Co, Nevada	8	10c	Dec 29,	Jan 24, Feb 15	Aug Waterman, Nevada Block
La Grange Ditch & Hy M Co, Cal	9	25c	Nov 10,	Dec 18, Jan 8	A Halsey, 328 Montgomery
North Gould & Curry G & S M Co, Nevada	15	10c	Dec 11,	Jan 12, Jan 23	O H Mason, 324 Montgomery
Mexican G & S M Co, Nevada	49	25c	Dec 16,	Jan 19, Feb 13	Chas E Elliot, Nevada Block
Overman S M Co, Nevada	69	10c	Nov 10,	Dec 14, Jan 4	Geo D Edwards, 414 California
Potosi M Co, Nevada	40	25c	Nov 13,	Dec 15, Jan 4	Chas E Elliot, 309 Montgomery
Savage M Co, Nevada	82	25c	Dec 2,	Jan 24	E B Holmes, Nevada Block
Yellow Jacket S M Co, Nev	55	25c	Nov 16,	Dec 21, Jan 27	W H Blauvelt, Mills Bldg

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE
Apollo Cons M Co	Annual	Louis Sloss Jr, 310 Sansome	Jan 8
Brunswick Cons M Co	Annual	J Stadtfeld Jr, Nevada Block	Jan 11
Bullion M Co	Annual	R B Grayson, 331 Pine	Jan 11
Cons St Gothard G M Co	Annual	J F Holling, Crocker Building	Jan 11
Iowa M Co	Annual	O B Higgins, 419 California	Jan 9
Silver King M Co	Annual	J W Pew, 310 Pine	Jan 9
Vulcan Powder Co	Annual	W Jay Smith, 218 California	Jan 9

Cal. Debris Commission Notices.

THE CALIFORNIA DEBRIS COMMISSION having received petitions to mine, by the hydraulic process, from W. R. Stewart, in the Badger mine near Cno, Shasta Co., and to deposit tailings on adjacent flats; from Clonzo Eagle, in the Walker mine, near Ico, Shasta Co., to deposit tailings behind dams in Pomeroy Gulch; from McKinstry & Gilbert, in the Christmas Hill Seam diggings, near Butcher Ranch, Placer Co., to deposit tailings on the banks of a fork of the American river; from W. R. Read, in the Tannery Ravine mine, near Challenge Mills, Yuba Co., to deposit tailings behind dams in Tannery Ravine; from Manuel Mateos, in the Mateos mine, near Sierra City, to deposit tailings in Howard creek; from Jos. Davie, in the Davis mine, near Sierra City, to deposit tailings in Howard creek; from Frank Barbero, in the First Chance mine, near Sierra City, to deposit tailings behind dams in Howard creek; from Philip McGuire, in the North Star mine, near Mokelumne Hill, Calaveras Co., to deposit tailings behind dams in Buckeye Gulch, and from J. W. Smith, in the Green Mountain mine, near Mokelumne Hill, to deposit tailings behind dams in Chile Gulch, and from the 54 Flat Placer Mining Co., in the 54 Flat mine, near Volcano, Amador Co., Cal., to deposit tailings behind dams in a dry ravine—gives notice that a meeting will be held at Room 92, Flood Building, San Francisco, on January 2, 1894, at 1:30 P. M.

Assessment Notices.

STANDARD GOLD AND SILVER MINING COMPANY. Location of principal place of business, San Francisco, Cal. Location of works, Butte County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 18th day of December, 1893, an assessment, No. 1, of five cents per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin to the Secretary, at the office of the Company, Room 4, No. 330 Pine Street, San Francisco, Cal., or to the President, Tyler Beach, St. James Hotel, San Jose Cal. Any stock upon which the assessment shall remain unpaid on the 26th day of January, 1894, will be delinquent, and advertised for sale at public auction; and unless payment be made before, will be sold on SATURDAY, the 17th day of February, 1894, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors. T. E. JEWELL, Secretary.

Office—Room 4, 330 Pine Street, San Francisco, Cal.

DELINQUENT SALE NOTICE.

CO-OPERATIVE PRINTING CO., 408 Sacramento St., S. F., Cal.

NOTICE.—There is delinquent upon the following described stock, on account of assessments levied on the 22d day of November, 1893, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Cert.	No. Shares.	Amt.
H. P. Brown	2	330	$660 00
Morgan Backus	3	330	660 00
Geo. W. Craddock	6	50	100 00
E. L. Walcott	8	280	560 00
T. P. Robinson (not issued)	9	330	660 00

And in accordance with law and an order of the Board of Directors made on the 22 day of November, 1893, so many shares of each parcel of such stock as may be necessary, will be sold, at the office of the Company, 408 Sacramento St., S. F., Cal., on the 5th day of January, 1894, at 12 o'clock noon of such day, to pay delinquent assessments thereon, together with the costs of advertising and expenses of the sale.

MORGAN BACKUS, Secretary.

408 Sacramento St., S. F., Cal.

FOR SALE OR RENT.

THE TOSTON SMELTER.

Specially adapted for pyritic smelting. Capacity 100 tons per diem. On the Northern Pacific R. R., within a few miles of the extensive gold deposits of Radersburg, St. Louis, Winston, etc. Apply

Manager TOSTON SMELTING CO.,

TOSTON, MONTANA.

Metallurgy and Ores.

SELBY

SMELTING AND LEAD CO.

416 Montgomery St., San Francisco.

GOLD AND SILVER REFINERY

— AND —

ASSAY OFFICE.

Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

—MANUFACTURERS OF—

BLUESTONE. LEAD PIPE, SHEET LEAD, SHOT, ETC., ETC.

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Standard Shot - Gun Cartridges,

Under Chamberlin Patent.

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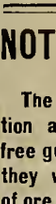
IMPORTERS AND DEALERS IN

ASSAYERS' MATERIALS, MINE AND MILL SUPPLIES,

ALSO CHEMICALS, AND PHYSICAL, SCHOOL AND CHEMICAL APPARATUS.

68 & 65 First St., cor. Mission, San Francisco



We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Scorifiere, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing the supplies since the first discovery of mines in the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price.

Agents of the **Denver Fire Clay Co.** and for the **Morgan Crucible Co.**, Battersea, England. Also for **E. G. Denniston's** Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices. Our Illustrated Catalogue and Assay Tables sent free on application.

JOHN TAYLOR & CO.

NOTICE TO MINE OWNERS!

The undersigned will have in operation at the Midwinter Fair a complete free gold and concentrating plant, where they will work, free of charge, any lots of ore from one to five tons.

For further information address them at 213 First Street, San Francisco.

F. A. HUNTINGTON.

GEO. E. WOODBURY.

Professional.

STEPHEN H. EMMENS,

Consulting Engineer and Chemist,

165 Crocker Building, San Francisco, Cal.

EMMENS & CO.,

Bankers and Agents.

165 Crocker Building, San Francisco, Cal.

APPROVED Gold Properties Organized and Stocked.

EDMUND B. KIRBY,

Consulting Mining Engineer and Metallurgist

No. 9 Windsor Hotel Blk., DENVER, COLO.

SPECIALTY—The Expert Examination of Mining Investments and Metallurgical Enterprises.

C. A. OGDEN. W. N. JEHU.

JEHU & OGDEN,

Chemical Laboratory and Assay Office.

(Formerly Evans' Assay Office.)

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Ore Assays, Analyses of Minerals, Waters, all Technical products, etc., made.

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Surveying, Architecture, Drawing and Assaying,

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Open all year.

A. VAN DER NAILLEN, President.

Assaying of Ores, $25; Bullion and Chlorination Assay, $25; Blowpipe Assay, $10. Full Course of Assaying, $50. ESTABLISHED 1864. Send for Circular.

STRIEDINGER & Von GELDERN,

Members Am. Soc. C. E., Etc.

56, Academy of Sciences Bldg, S. F.

Surveys, Highway Construction, Water Supply, Irrigation, River and Harbor Improvements, Gold and Silver Mining.

Nevada Metallurgical Works,

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